CHAPTER 23

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 23

COMMUNICATIONS

LIST OF EFFECTIVE PAGES

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	5	Dec 15/95	
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	10	Dec 15/95	
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	2	Mar 15/91	
	3	May 15/89	
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	5	Mar 15/91	
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	7	Mar 15/91	
	8	Mar 15/91	
	9	Mar 15/91	
	10	Mar 15/91	
	11	Mar 15/91	
	12	Mar 15/91	
23-conts	1	May 15/85	
23-conts	2	Mar 15/91	
23-conts	3	Mar 15/91	
R 23-conts	4	Dec 15/95	
23-conts	5	Jun 15/95	
23-conts	6	Jun 15/95	
23-conts	7	Dec 15/91	
23-conts	8	Nov 15/81	
23-conts	9/10	Nov 15/81	
23-DIAGM	1	May 15/82	
23-DIAGM	2	May 15/82	
23-DIAGM	3	Aug 15/82	
23-DIAGM	4	Aug 15/82	
23-DIAGM	5	Mar 15/91	
23-DIAGM	6	Mar 15/91	
23-DIAGM	7	Mar 15/91	
23-DIAGM	8	Mar 15/91	
23-DIAGM	9	Mar 15/91	
23-DIAGM	10	Mar 15/91	
23-DIAGM	11	Mar 15/91	
23-DIAGM	12	Mar 15/91	
23-DIAGM	13	Mar 15/91	
23-DIAGM	14	Mar 15/91	
23-DIAGM	15/16	Mar 15/91	
23-INDEX	1	Mar 15/91	
23-INDEX	2	Mar 15/91	
23-INDEX	3	Mar 15/91	
23-INDEX	4	Mar 15/91	
23-INDEX	5	Mar 15/91	
23-INDEX	6	Mar 15/91	
23-INDEX	7	Dec 15/91	
23-INDEX	8	Dec 15/91	
23-INDEX	9	Mar 15/91	
23-INDEX	10	Mar 15/91	
23-INDEX	11	Dec 15/91	
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23-INDEX	17	Dec 15/93	
23-INDEX	18	Mar 15/91	
23-INDEX	19	Mar 15/91	
23-INDEX	20	Mar 15/91	
23-INDEX	21	Mar 15/91	
23-INDEX	22	Mar 15/91	
23-INDEX	23	Mar 15/91	
23-INDEX	24	Mar 15/91	
23-INDEX	25/26	Mar 15/91	
23-00-00	1	Aug 15/81	
23-00-00	2	May 15/82	
23-00-00	3/4	May 15/82	
23-00-00	5	Aug 15/82	
23-00-00	6	Nov 15/77	
23-00-00	7/8	Sep 15/80	
23-00-00	9/10	Sep 15/80	
23-00-00	11	May 15/82	
23-00-00	12	May 15/82	
23-00-01	401	Feb 15/82	
23-00-01	402	Feb 15/82	

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23-00-01	403/404	Feb 15/82	
23-09-00	1	Dec 15/91	
23-09-00	2	Feb 15/82	
23-09-00	3	Aug 15/82	
23-09-00	4	Feb 15/82	
23-09-00	5	Feb 15/82	
23-09-00	6	Feb 15/82	
23-09-00	7	Feb 15/82	
23-09-00	8	Feb 15/82	
23-09-00	9	Aug 15/82	
23-09-00	10	Feb 15/82	
23-09-00	11/12	Feb 15/82	
23-09-00	501	Aug 15/81	
23-09-00	502	Feb 15/82	
23-09-00	503	Feb 15/82	
23-09-00	504	Feb 15/82	
23-09-00	505	Feb 15/82	
23-09-00	506	Feb 15/82	
23-09-00	507	Feb 15/82	
23-09-00	508	Feb 15/82	
23-09-00	509	Feb 15/82	
23-09-00	510	Feb 15/82	
23-09-01	601	Aug 15/81	
23-09-01	602	Aug 15/81	
23-09-01	603/604	Aug 15/81	
23-11-00	1	May 15/82	
23-11-00	2	May 15/82	
23-11-00	3/4	May 15/82	
23-11-00	5/6	May 15/82	
23-11-00	7	May 15/82	
23-11-00	8	May 15/82	
23-11-00	9	May 15/82	
23-11-00	10	May 15/82	
23-11-00	11/12	May 15/82	
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23-11-00	19	May 15/82	
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23-11-00	22	Jul 15/83	
23-11-00	23	May 15/82	
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23-11-00	111/112	Mar 15/84	
23-11-00	113/114	Mar 15/84	
23-11-00	115/116	Mar 15/84	
23-11-00	117/118	Mar 15/84	
23-11-00	119/120	Mar 15/84	
23-11-00	121/122	Mar 15/84	
23-11-00	123/124	Mar 15/84	
23-11-00	125/126	Mar 15/84	
23-11-00	127	Mar 15/84	
23-11-00	128	Mar 15/84	
23-11-00	201	May 15/87	
23-11-00	202	May 15/87	
23-11-00	203/204	May 15/87	
23-11-00	501	May 15/85	
23-11-00	502	May 15/85	
23-11-00	503	May 15/85	
23-11-00	504	May 15/82	
23-11-00	505/506	May 15/82	
23-11-01	401/402	May 15/85	
23-11-02	401	Nov 15/86	
23-11-02	402	Nov 15/86	
23-11-02	403	Nov 15/86	
23-11-02	404	Nov 15/86	
23-11-02	405/406	Jul 15/84	
23-11-03	401	May 15/85	
23-11-03	402	May 15/85	
23-11-03	701/702	Aug 15/81	
23-11-04	401	May 15/82	
23-11-04	402	May 15/82	
23-11-04	403	May 15/82	
23-11-04	404	May 15/82	
23-11-05	401	May 15/82	
23-11-05	402	Nov 15/82	
23-11-05	403	Nov 15/82	
23-11-05	404	May 15/82	
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23-22-00	1	Nov 15/82	
23-22-00	2	Feb 15/75	
23-22-00	3	Nov 15/82	
23-22-00	4	May 15/85	

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23-22-00	5	May 15/85	
23-22-00	6	May 15/85	
23-22-00	7	May 15/85	
23-22-00	8	May 15/85	
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23-22-00	10	May 15/85	
23-22-00	101	Mar 15/81	
23-22-00	102	Feb 15/82	
23-22-00	103	Mar 15/81	
23-22-00	104	Mar 15/81	
23-22-00	105	May 15/85	
23-22-00	106	May 15/85	
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23-22-00	109/110	May 15/85	
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23-22-00	502	Nov 15/89	
23-22-00	503/504	May 15/88	
23-22-01	401	Jun 15/92	
23-22-01	402	Aug 15/81	
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23-22-02	402	Jan 15/73	
23-23-00	1	Feb 15/82	
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23-23-00	3	Feb 15/75	
23-23-00	4	Feb 15/82	
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23-23-00	6	Aug 15/82	
23-23-00	7/8	Feb 15/82	
23-23-00	9/10	Aug 15/82	
23-23-00	101	Mar 15/81	
23-23-00	102	Aug 15/81	
23-23-00	103	Mar 15/81	
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23-23-00	108	Feb 15/82	
23-23-00	109/110	Feb 15/82	
23-23-00	111/112	Feb 15/82	
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23-23-00	117/118	Feb 15/82	
23-23-00	119/120	Feb 15/82	
23-23-00	201/202	Mar 15/81	
23-23-00	501	Feb 15/82	
23-23-00	502	Feb 15/82	
23-23-00	503	Feb 15/82	
23-23-00	504	Feb 15/82	
23-23-01	401	May 15/82	
23-23-01	402	Jun 15/80	
23-23-02	401	Jul 15/84	
23-23-02	402	May 15/88	
23-23-02	403	May 15/88	
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23-23-02	405	May 15/88	
23-23-02	406	May 15/88	
23-23-02	407/408	May 15/88	
23-23-02	501	Aug 15/81	
23-23-02	502	Aug 15/81	
23-23-02	503	Aug 15/81	
23-23-02	504	Aug 15/81	
23-23-02	505/506	Aug 15/81	
23-23-02	601/602	Sep 15/73	
23-23-03	401	Nov 15/78	
23-23-03	402	Aug 15/82	
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23-24-00	14	Mar 15/91	
23-24-00	15/16	Mar 15/91	
23-24-00	101	Mar 15/91	
23-24-00	102	Mar 15/91	
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23-24-00	106	Mar 15/91	
23-24-00	107/108	Mar 15/91	
23-24-00	109/110	Mar 15/91	
23-24-00	501	Mar 15/91	
23-24-00	502	Mar 15/91	
23-24-00	503	Mar 15/91	
23-24-00	504	Mar 15/91	
23-24-00	505	Mar 15/91	
23-24-00	506	Mar 15/91	
23-24-00	507	Mar 15/91	

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23-24-00	509	Mar 15/91	
23-24-00	510	Mar 15/91	
23-24-01	401/402	Mar 15/91	
23-24-02	401	Mar 15/91	
23-24-02	402	Mar 15/91	
23-30-00	1	May 15/86	
23-30-00	2	May 15/76	
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23-31-00	1	Feb 15/82	
23-31-00	2	Feb 15/82	
23-31-00	3/4	Aug 15/76	
23-31-00	5	Feb 15/82	
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23-31-00	9	Feb 15/82	
23-31-00	10	Feb 15/82	
23-31-00	11	Mar 15/83	
23-31-00	12	Feb 15/82	
23-31-00	13	Feb 15/82	
23-31-00	14	Feb 15/82	
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23-31-00	16	Feb 15/82	
23-31-00	17/18	Mar 15/83	
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23-31-00	103	Mar 15/81	
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23-31-00	121/122	Nov 15/81	
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23-31-00	125/126	Nov 15/81	
23-31-00	127/128	Nov 15/81	
23-31-00	129/130	Nov 15/81	
23-31-00	131/132	Nov 15/81	
23-31-00	133/134	Nov 15/81	
23-31-00	135/136	Nov 15/81	
23-31-00	137/138	Nov 15/81	
23-31-00	139/140	Nov 15/81	
23-31-00	141/142	Nov 15/81	
23-31-00	143/144	Nov 15/81	
23-31-00	145/146	Nov 15/81	
23-31-00	147/148	Nov 15/81	
23-31-00	149/150	Nov 15/83	
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23-31-00	506	May 15/89	
23-31-00	507	May 15/89	
23-31-00	508	Jun 15/93	
23-31-00	509/510	May 15/89	
23-31-01	401	May 15/89	
23-31-01	402	Aug 15/82	
23-31-02	401	May 15/82	
23-31-02	402	Aug 15/81	
23-31-02	403	Aug 15/81	
23-31-02	404	May 15/82	
23-31-03	401	Aug 15/76	
23-31-03	402	Dec 1/71	
23-31-03	403	Aug 15/76	
23-31-03	404	Aug 15/76	
23-31-03	405	Feb 15/76	
23-31-03	406	Aug 15/76	
23-31-03	407	Aug 15/76	
23-31-03	408	May 15/82	
23-31-03	409	May 15/82	
23-31-03	410	May 15/82	
23-31-04	401	Nov 15/82	
23-31-04	402	Nov 15/82	
23-31-04	403	Nov 15/82	
23-31-04	404	Nov 15/82	
23-31-06	401	Jun 15/80	
23-31-06	402	Mar 1/72	
23-31-06	403	Nov 15/82	
23-31-06	404	May 15/82	
23-31-06	405	Mar 1/72	
23-31-06	406	May 15/82	
23-31-06	407	May 15/82	
23-31-06	408	May 15/82	

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23-31-12	401	Aug 15/82	
23-31-12	402	May 15/76	
23-31-13	401/402	Dec 1/71	
23-31-14	401	Nov 15/74	
23-31-14	402	Nov 15/74	
23-31-14	403/404	Nov 15/74	
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23-33-00	14	Feb 15/82	
23-33-00	15/16	Sep 15/80	
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23-33-00	35	Nov 15/82	
23-33-00	36	Aug 15/81	
23-33-00	37	Aug 15/81	
23-33-00	38	Dec 15/92	
23-33-00	39	Aug 15/81	
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23-33-00	127	Aug 15/81	
23-33-00	128	Aug 15/81	
23-33-00	129	Aug 15/81	
23-33-00	130	Aug 15/81	

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23-33-00	132	Aug 15/81	
23-33-00	133/134	Aug 15/81	
23-33-00	135/136	Aug 15/81	
23-33-00	137/138	Aug 15/81	
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23-33-00	159/160	May 15/85	
23-33-00	161/162	May 15/85	
23-33-00	163/164	May 15/85	
23-33-00	165/166	May 15/85	
23-33-00	167/168	May 15/85	
23-33-00	169/170	May 15/85	
23-33-00	171/172	May 15/85	
23-33-00	173/174	May 15/85	
23-33-00	175/176	May 15/85	
23-33-00	177/178	May 15/85	
23-33-00	179/180	May 15/85	
23-33-00	181/182	May 15/85	
23-33-00	183/184	May 15/85	
23-33-00	185/186	May 15/85	
23-33-00	187/188	May 15/85	
23-33-00	189/190	May 15/85	
23-33-00	191/192	May 15/85	
23-33-00	501	Dec 15/80	
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23-33-00	506	Aug 15/81	
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23-33-00	515	Jun 15/94	
23-33-00	516	Mar 15/84	
23-33-02	401	Nov 15/77	
23-33-02	402	Dec 1/71	
23-33-03	401	Dec 15/93	
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23-33-03	403	Dec 15/93	
23-33-03	404	Sep 15/80	
23-33-04	401	Nov 15/82	
23-33-04	402	Nov 15/82	
23-33-04	403	Nov 15/82	
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Adjustment/Test		501	CONFIG 2 032-999
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STATIC DISCHARGING SYSTEM	23-61-00		
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Inspection/Check		601	ALL
DISCHARGER - STATIC	23-61-01		
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Subject	Chapter Section Subject	Page	Effectivity
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RECORDER - VOICE	23-71-01		
Removal/Installation		401	ALL
PANEL - CONTROL	23-71-02		
Removal/Installation		401	ALL
UNDERWATER LOCATING DEVICE (ULD)	23-71-03		
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Adjustment/Test		501	ALL

CHAPTER 23-COMMUNICATIONS

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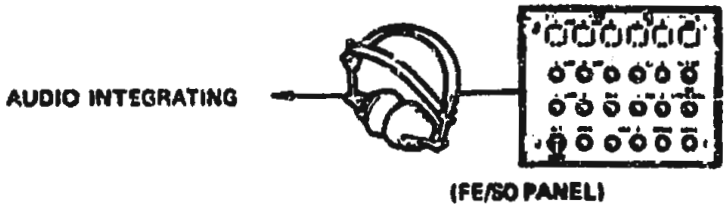

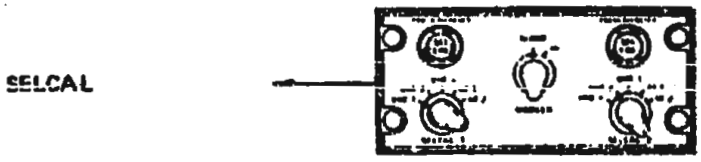

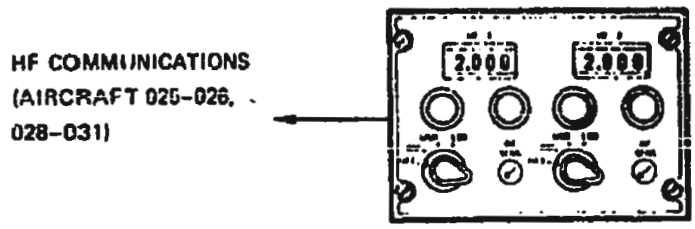

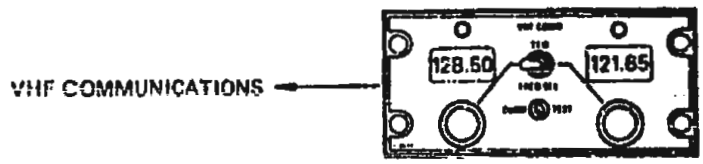

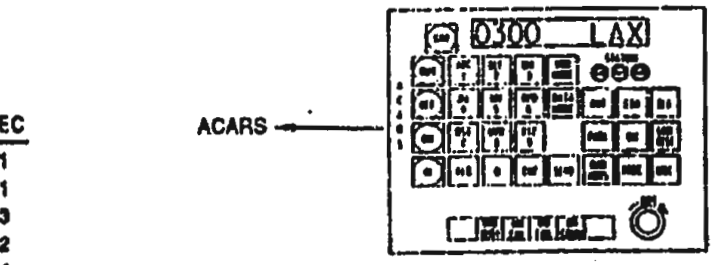

TITLE	CHAP/SEC
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M1-0002-23-5001

R COMMUNICATIONS CONTENTS

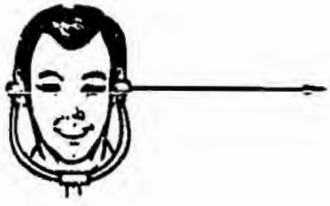
EFFECTIVITY: ALL

001B

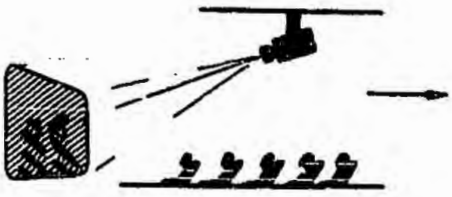
COMMUNICATIONS CONTENTS

PASSENGER ADDRESS

PASSENGER SERVICES



PASSENGER AUDIO ENTERTAINMENT



PASSENGER VISUAL ENTERTAINMENT

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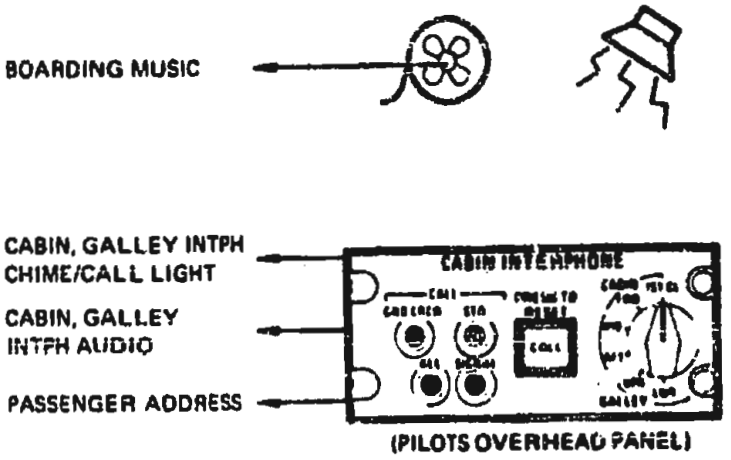
PASSENGER AUDIO ENTERTAINMENT	2333
PASSENGER SERVICES	2331
PASSENGER VISUAL ENTERTAINMENT	2331

M1-0001-23-8008

COMMUNICATIONS CONTENTS



(PILOTS OVERHEAD PANEL)

TITLE	CHAP/SEC
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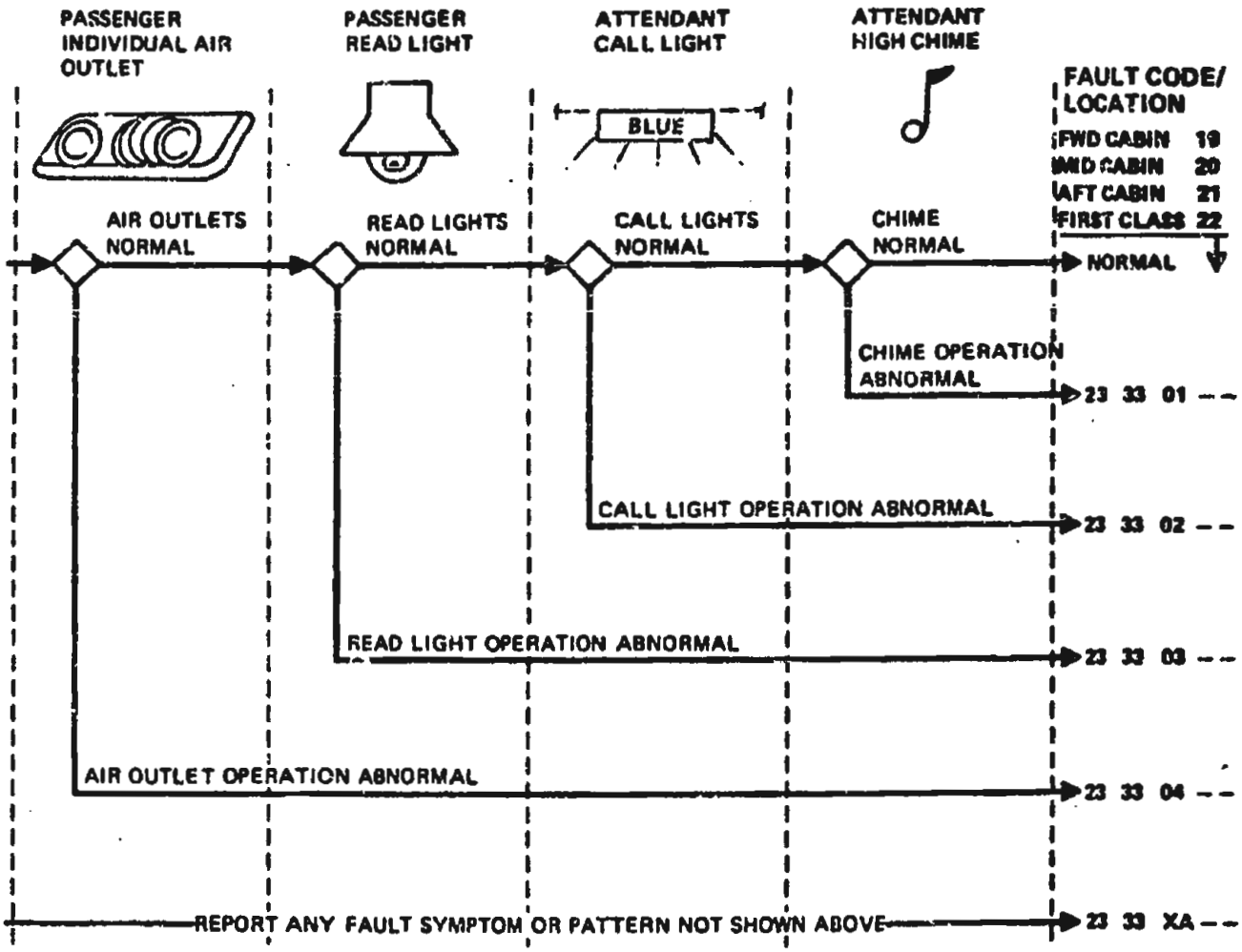
CABIN, GALLEY INTPH AUDIO	2341
CABIN, GALLEY INTPH CHIME/CALL LIGHT	2341
PASSENGER ADDRESS	2331

M1-0000-23-9031



APPLICABLE CIRCUIT BREAKERS

1A15 [PA NO. 1]
1A16 [PA NO. 2]
2C8 [HOST ADVSY IND]
2D10 [CC 2, 3] OR 2D11 [MULTIPLEX SYSTEM]
2D11 [CC 1, 4]
L10E–L12E [SUBMULTIPLEXER–FWD, MID + AFT]
L2F–L9F [POWER–PASS SVCE MDL–1, 2, 3, 4, 5, 6, 7, 8]
R4E [POWER SUPPLY MULTIPLEXED PASS. SERVICE]
R5F [COMPT CONT FANS]

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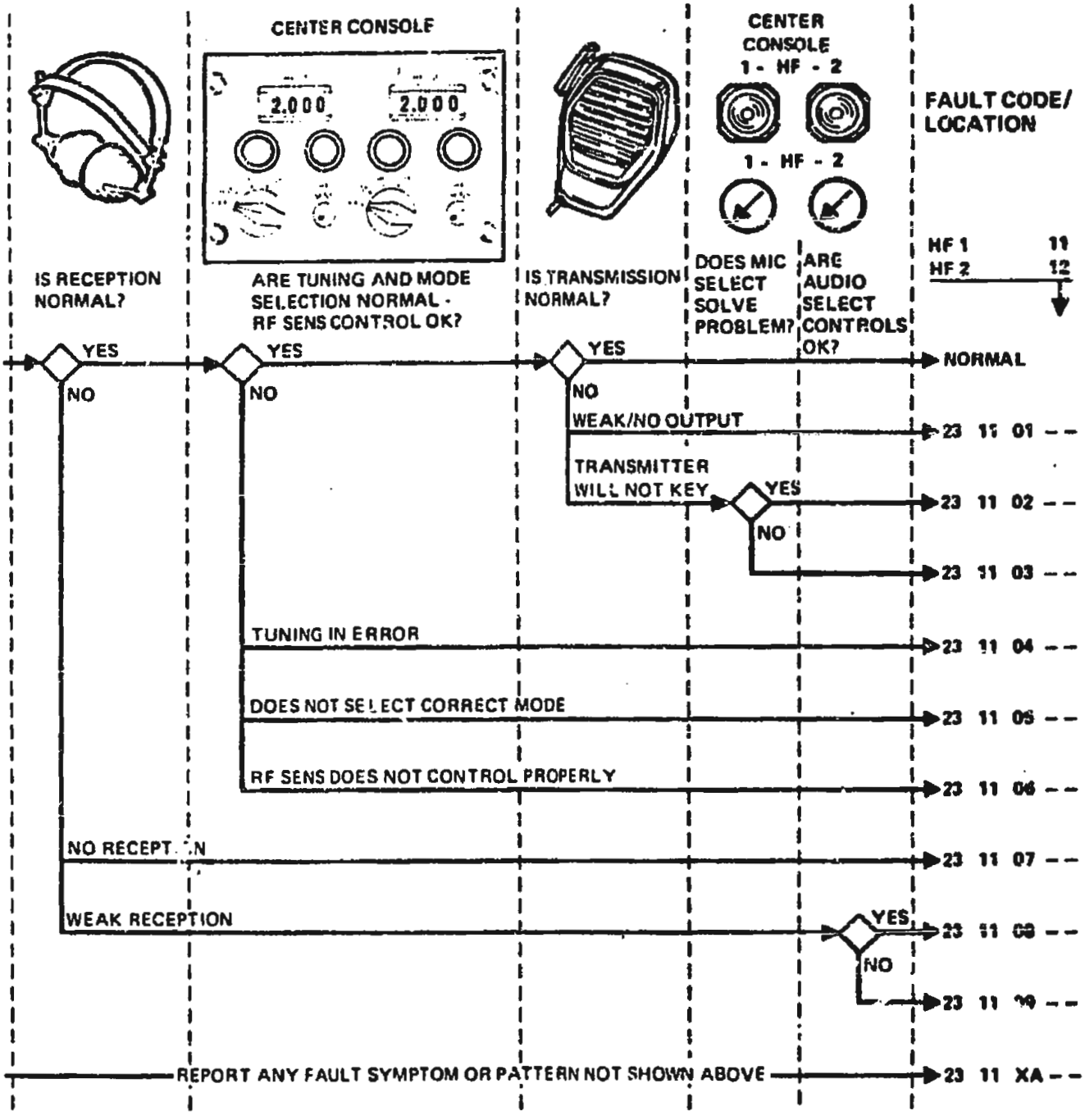
R Passenger Services - Fault Codes
Figure 1



APPLICABLE CIRCUIT BREAKERS

1C1	HF NO. 1	DC
1C3	HF NO. 1	AC
1C19	HF NO. 2	DC
1C21	HF NO. 2	AC

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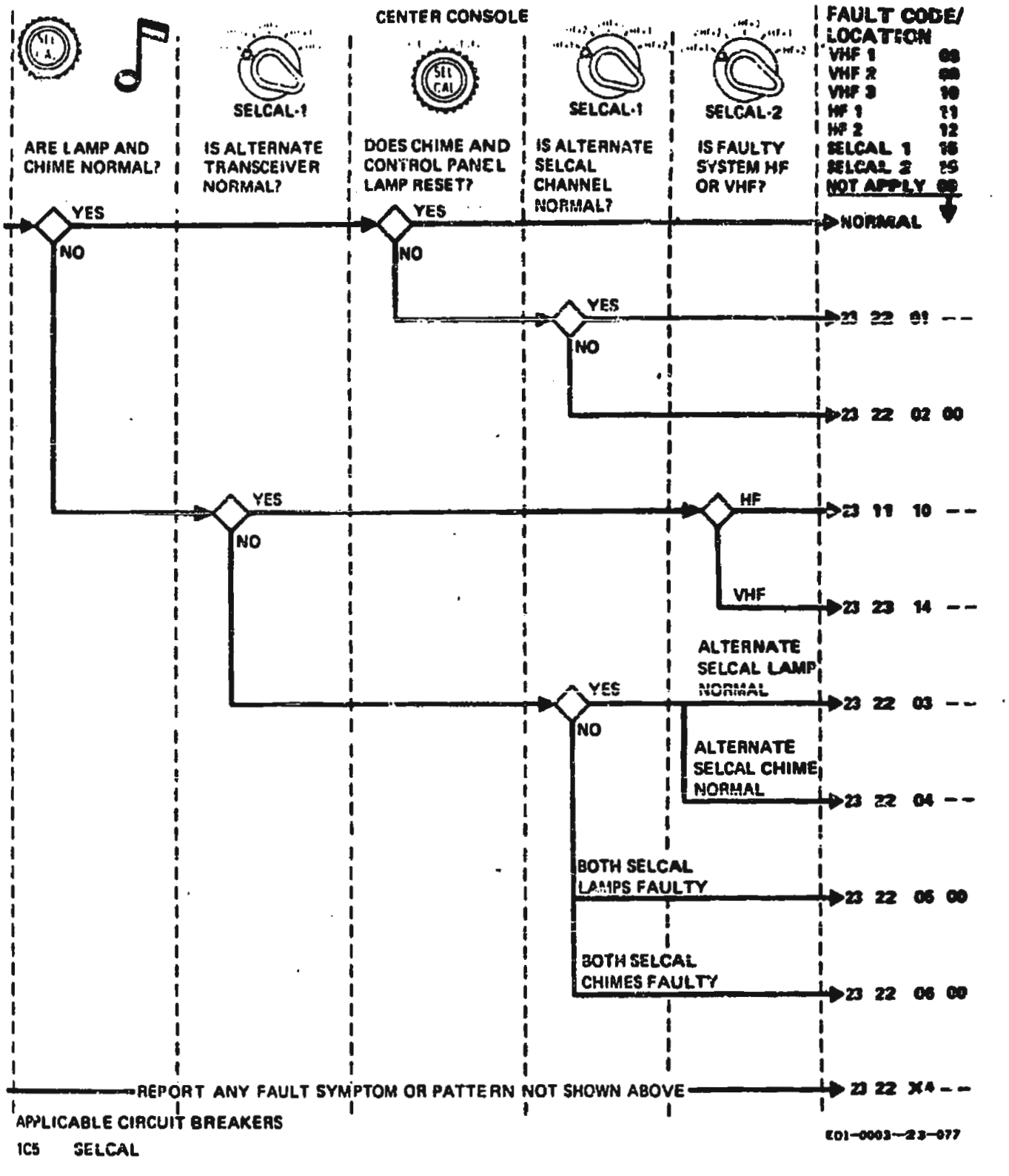
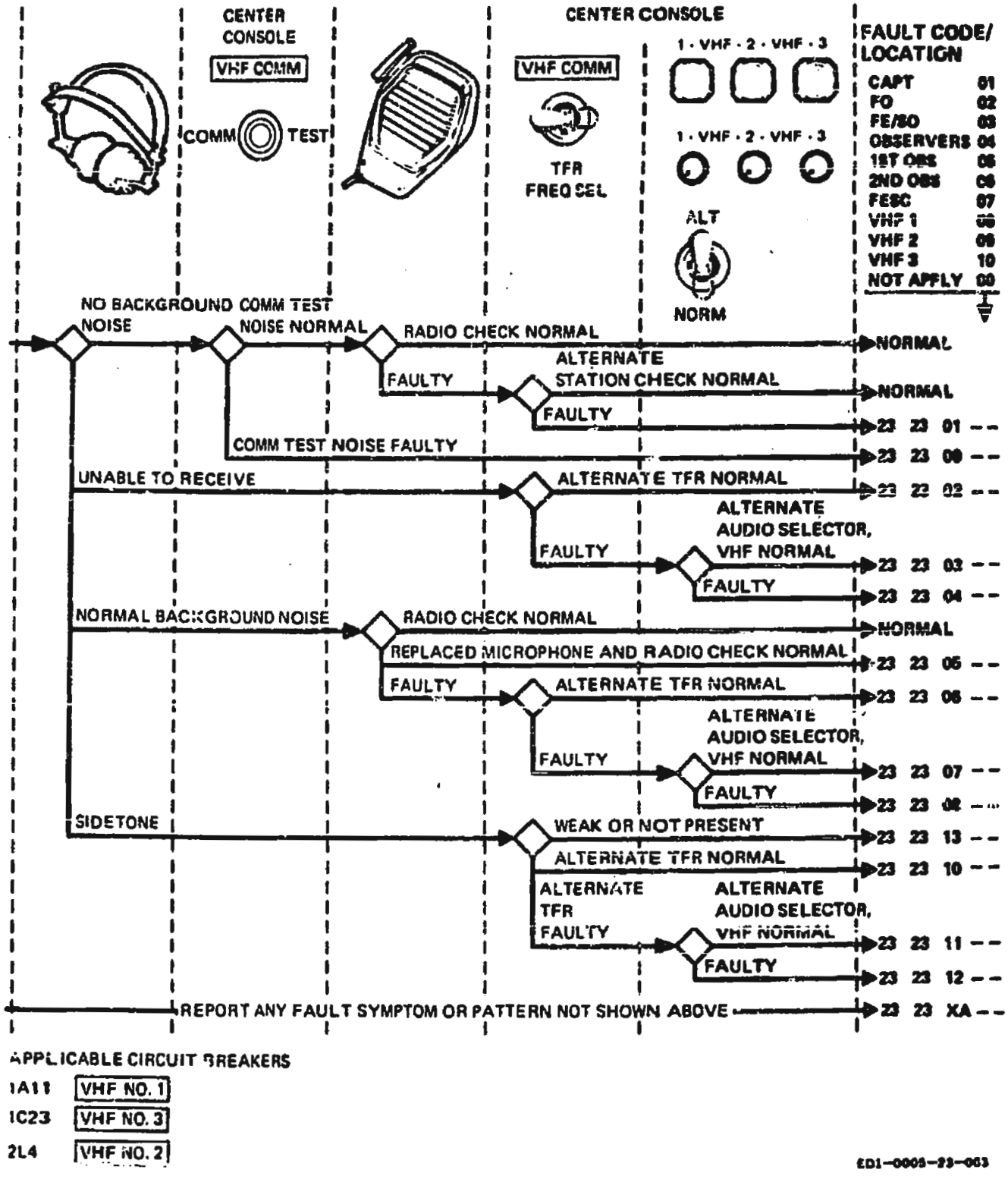
R HF Communications - Fault Codes
Figure 2

R EFFECTIVITY: HF EQUIPPED AIRCRAFT

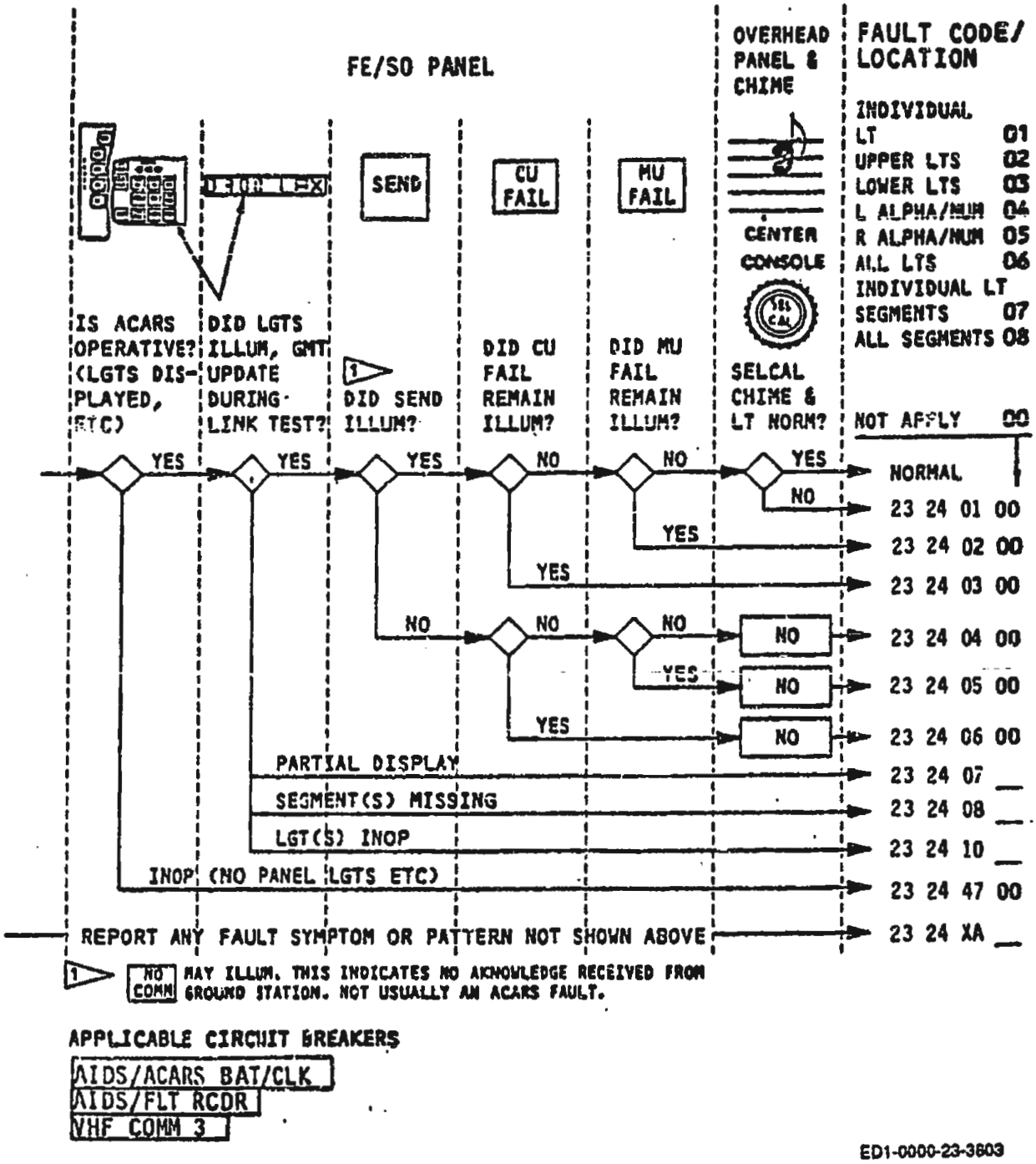
23-FAULT CODE DIAGRAM



SELCAL - Fault Codes
Figure 3



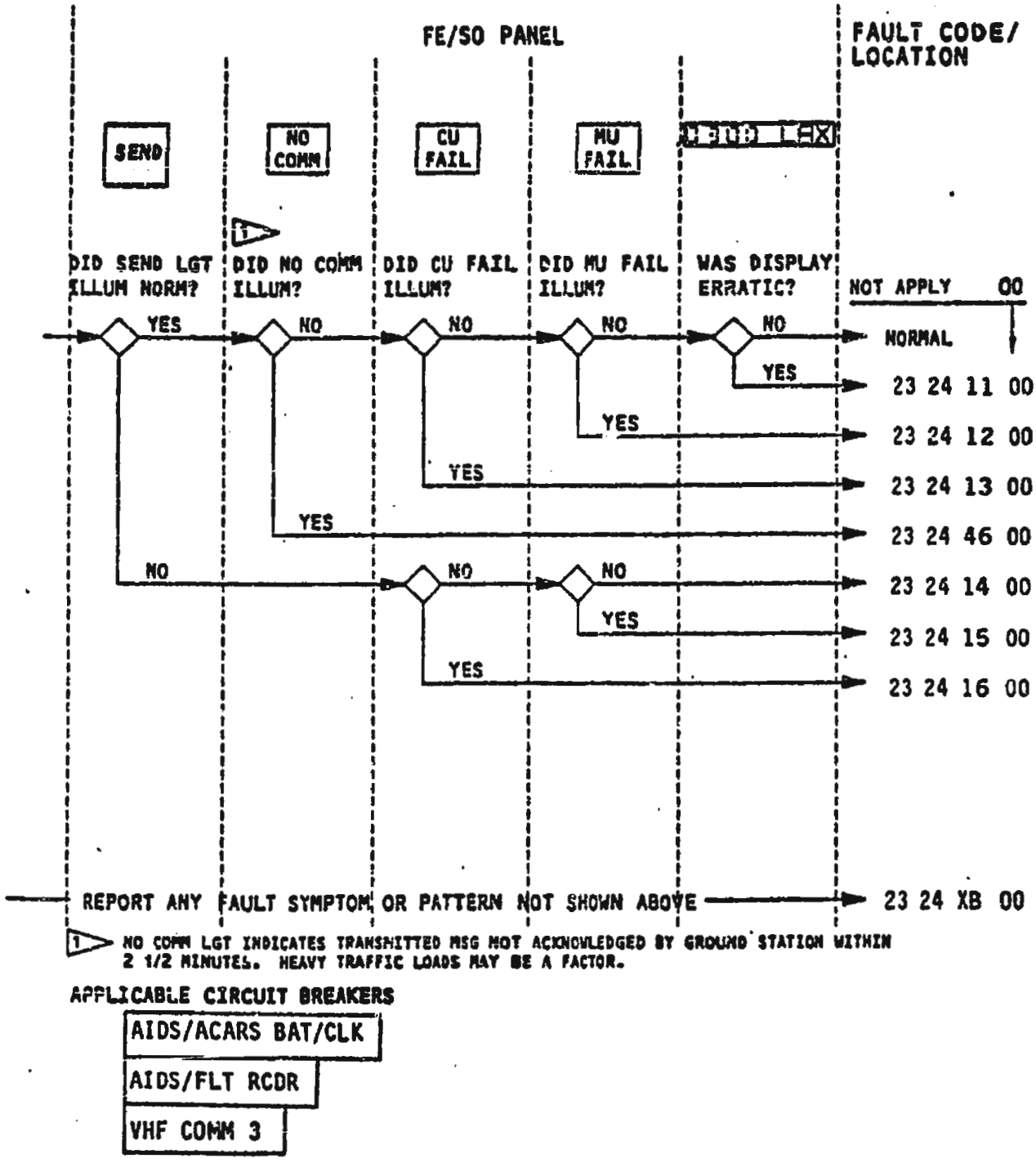
VHF Communications - Fault Codes
Figure 4



R ACARS INOPERATIVE, LINK TEST-FAULT CODES - Fault Codes
Figure 5

R EFFECTIVITY: ALL

050B

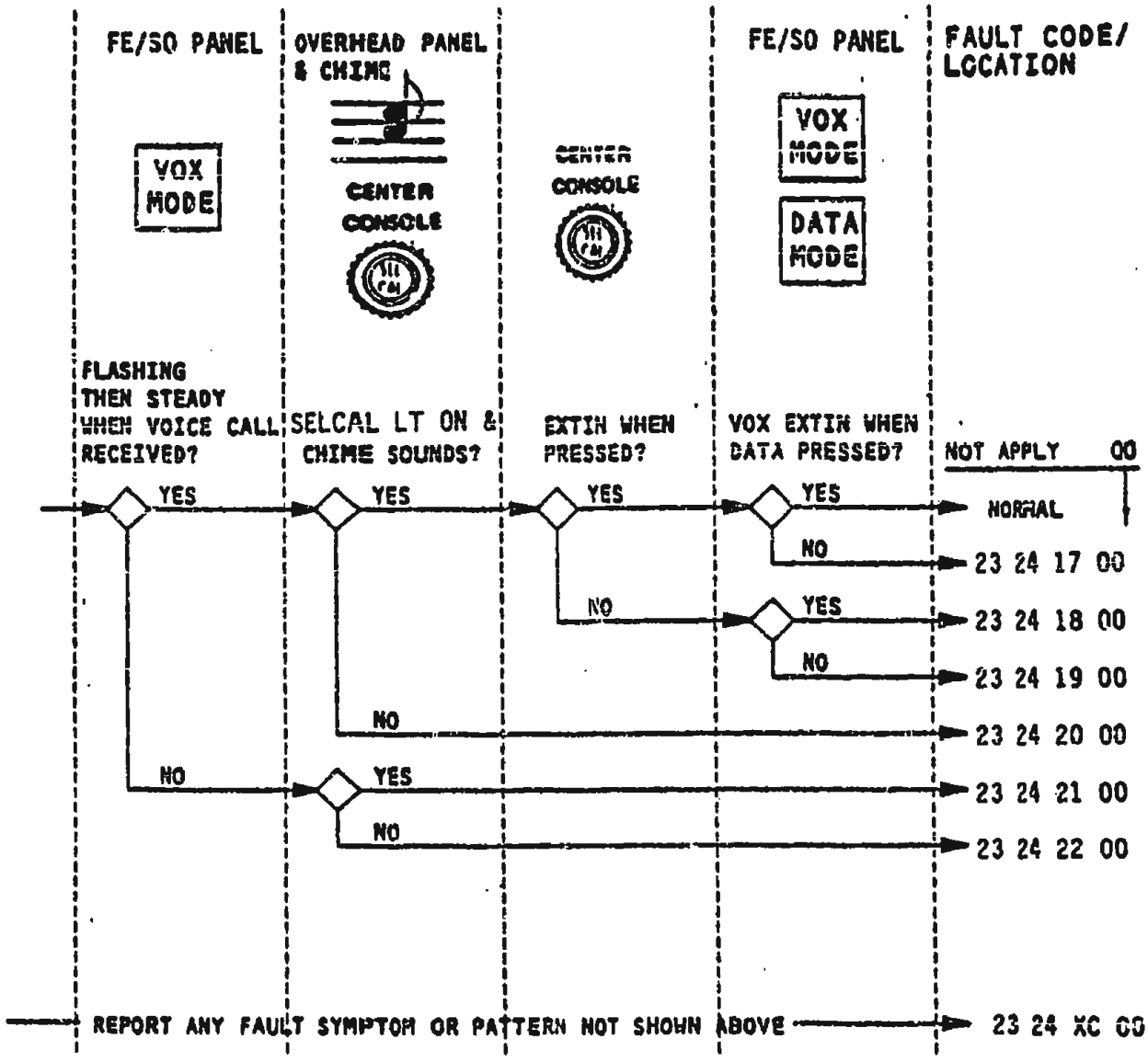


R ACARS DATA MODE - FAULT CODES - Fault Codes
Figure 6

R EFFECTIVITY: ALL

050B

23-FAULT CODE DIAGRAM



APPLICABLE CIRCUIT BREAKERS

- AIDS/ACARS BAT/CLK
- AIDS/FLT RCDR
- VHF COMM 3

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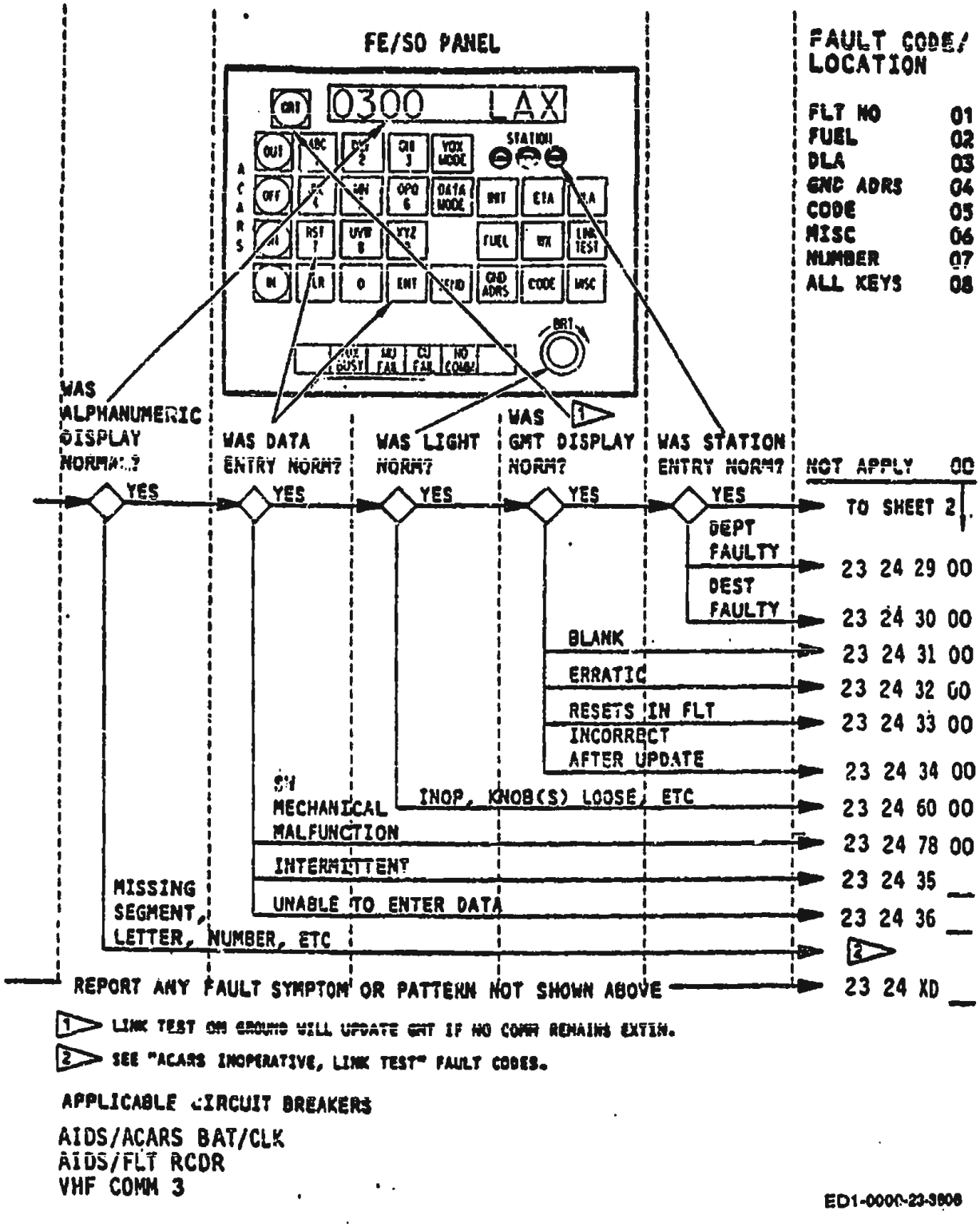
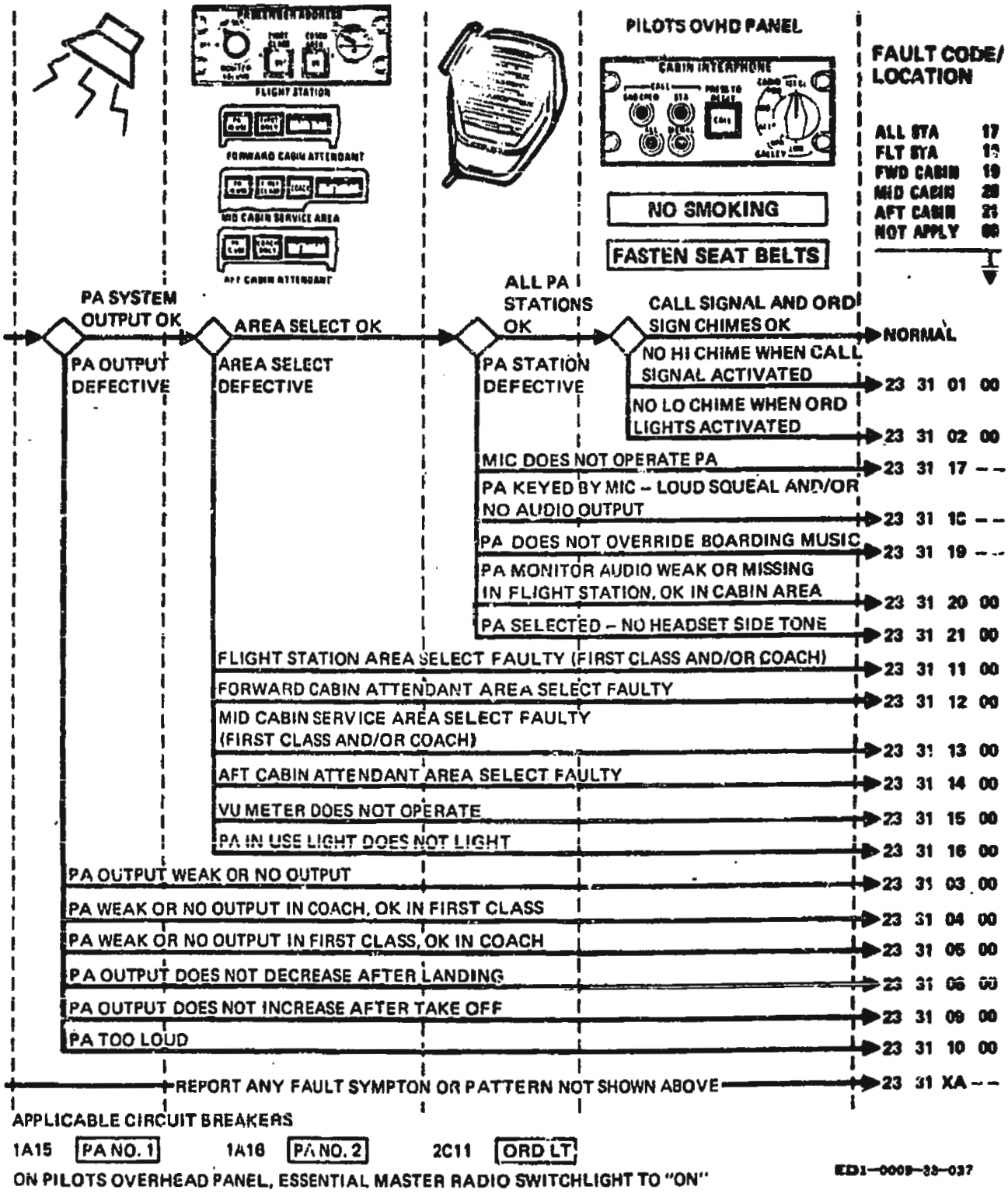
R ACARS VOICE MODE - FAULT CODES - Fault Codes
Figure 7

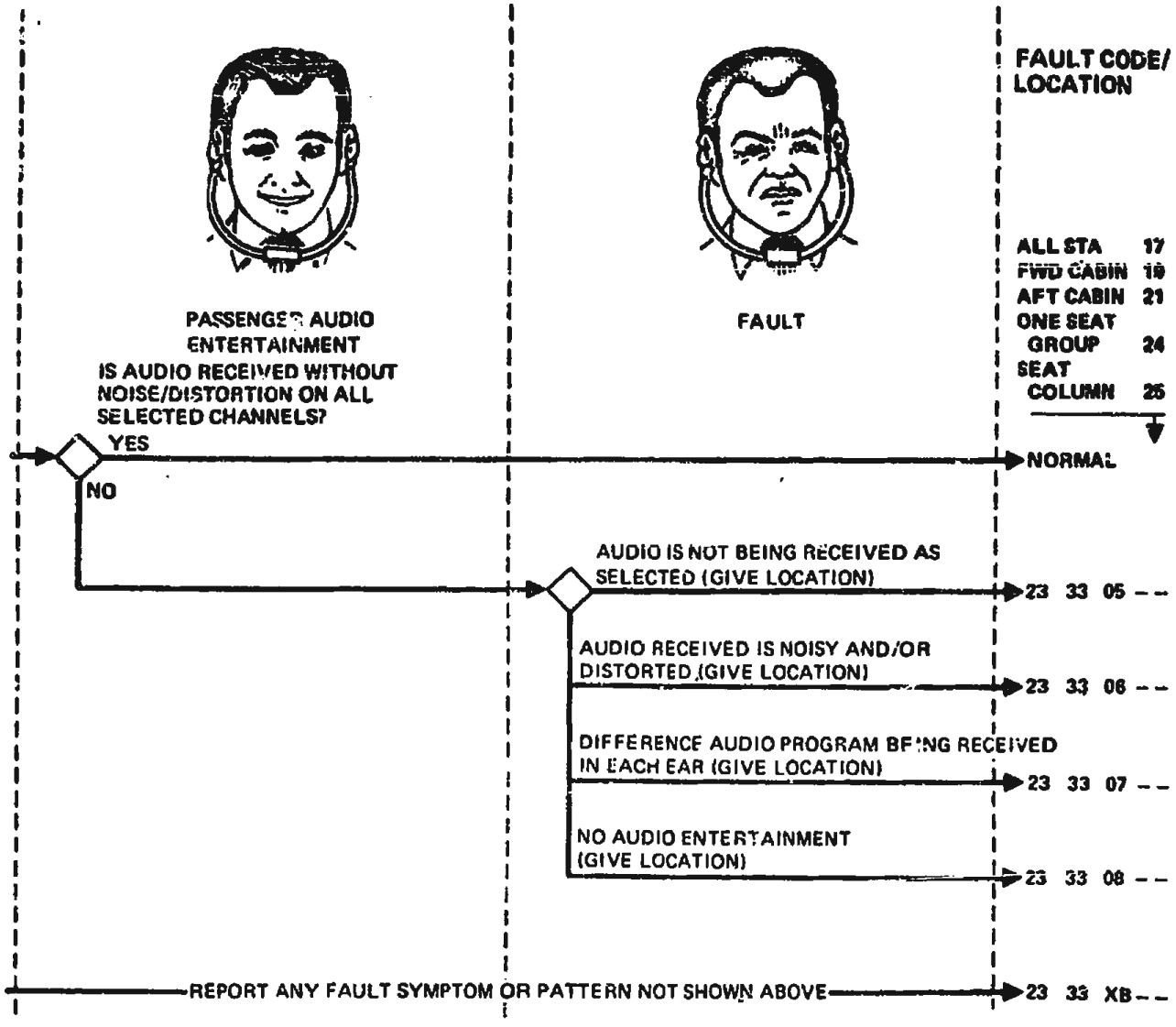
R EFFECTIVITY: ALL



R ACARS DATA DISPLAY/DATA ENTRY/PANEL LGT - FAULT CODES - Fault Codes
Figure 8


PILOTS OVHD PANEL
CABIN INTERPHONE
NO SMOKING
FASTEN SEAT BELTS
FAULT CODE/ LOCATION
ALL STA 17
FLT STA 18
FWD CABIN 19
MID CABIN 20
AFT CABIN 21
NOT APPLY 00
PA SYSTEM OUTPUT OK
AREA SELECT OK
ALL PA STATIONS OK
CALL SIGNAL AND ORD SIGN CHIMES OK
NORMAL
PA OUTPUT DEFECTIVE
AREA SELECT DEFECTIVE
PA STATION DEFECTIVE
NO HI CHIME WHEN CALL SIGNAL ACTIVATED 23 31 01 00
NO LO CHIME WHEN ORD LIGHTS ACTIVATED 23 31 02 00
MIC DOES NOT OPERATE PA 23 31 17 - -
PA KEYED BY MIC – LOUD SQUEAL AND/OR NO AUDIO OUTPUT 23 31 1C - -
PA DOES NOT OVERRIDE BOARDING MUSIC 23 31 19 - -
PA MONITOR AUDIO WEAK OR MISSING IN FLIGHT STATION, OK IN CABIN AREA 23 31 20 00
PA SELECTED – NO HEADSET SIDE TONE 23 31 21 00
FLIGHT STATION AREA SELECT FAULTY (FIRST CLASS AND/OR COACH) 23 31 11 00
FORWARD CABIN ATTENDANT AREA SELECT FAULTY 23 31 12 00
MID CABIN SERVICE AREA SELECT FAULTY (FIRST CLASS AND/OR COACH) 23 31 13 00
AFT CABIN ATTENDANT AREA SELECT FAULTY 23 31 14 00
VU METER DOES NOT OPERATE 23 31 15 00
PA IN USE LIGHT DOES NOT LIGHT 23 31 16 00
PA OUTPUT WEAK OR NO OUTPUT 23 31 03 00
PA WEAK OR NO OUTPUT IN COACH, OK IN FIRST CLASS 23 31 04 00
PA WEAK OR NO OUTPUT IN FIRST CLASS, OK IN COACH 23 31 05 00
PA OUTPUT DOES NOT DECREASE AFTER LANDING 23 31 06 00
PA OUTPUT DOES NOT INCREASE AFTER TAKE OFF 23 31 09 00
PA TOO LOUD 23 31 10 00
REPORT ANY FAULT SYMPTON OR PATTERN NOT SHOWN ABOVE 23 31 XA - -
APPLICABLE CIRCUIT BREAKERS
1A15 PA NO. 1
1A16 PA NO. 2
2C11 ORD LT
ON PILOTS OVERHEAD PANEL, ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON"
ED1-0009-33-037

Passenger Address System - Fault Codes
Figure 9


FAULT CODE/ LOCATION
PASSENGER AUDIO ENTERTAINMENT
FAULT
ALL STA 17
FWD CABIN 19
AFT CABIN 21
ONE SEAT GROUP 24
SEAT COLUMN 25
IS AUDIO RECEIVED WITHOUT NOISE/DISTORTION ON ALL SELECTED CHANNELS?
YES
NORMAL
NO
AUDIO IS NOT BEING RECEIVED AS SELECTED (GIVE LOCATION)
23 33 05 - -
AUDIO RECEIVED IS NOISY AND/OR DISTORTED (GIVE LOCATION)
23 33 06 - -
DIFFERENCE AUDIO PROGRAM BEING RECEIVED IN EACH EAR (GIVE LOCATION)
23 33 07 - -
NO AUDIO ENTERTAINMENT (GIVE LOCATION)
23 33 08 - -
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE
23 33 XB - -

APPLICABLE CIRCUIT BREAKERS

2C8 HOST ADVSY IND

2D10 CC 2, 3

2D11 CC 1, 4

OR 2D11 MULTIPLEX SYSTEM

GALLEY LEFT CIRCUIT BREAKER PANEL

L8E AUDIO ENTERTAINMENT – TAPE RPDR

L10E–L12E AUDIO ENTERTAINMENT – SUB MULTIPLEXER – FWD, MID AFT, AND AFT

L2F–L9F POWER – PASS SVCE MDL 1–8

(ADDITIONAL CIRCUIT BREAKERS ON MULTIPLEX POWER SUPPLY, MID ELECTRICAL SERVICE CENTER LEFT RACK)

GALLEY RIGHT CIRCUIT BREAKER PANEL

R4E POWER SUPPLY MULTIPLEXED PASS. SERVICE

R5F COMPT CONT FANS

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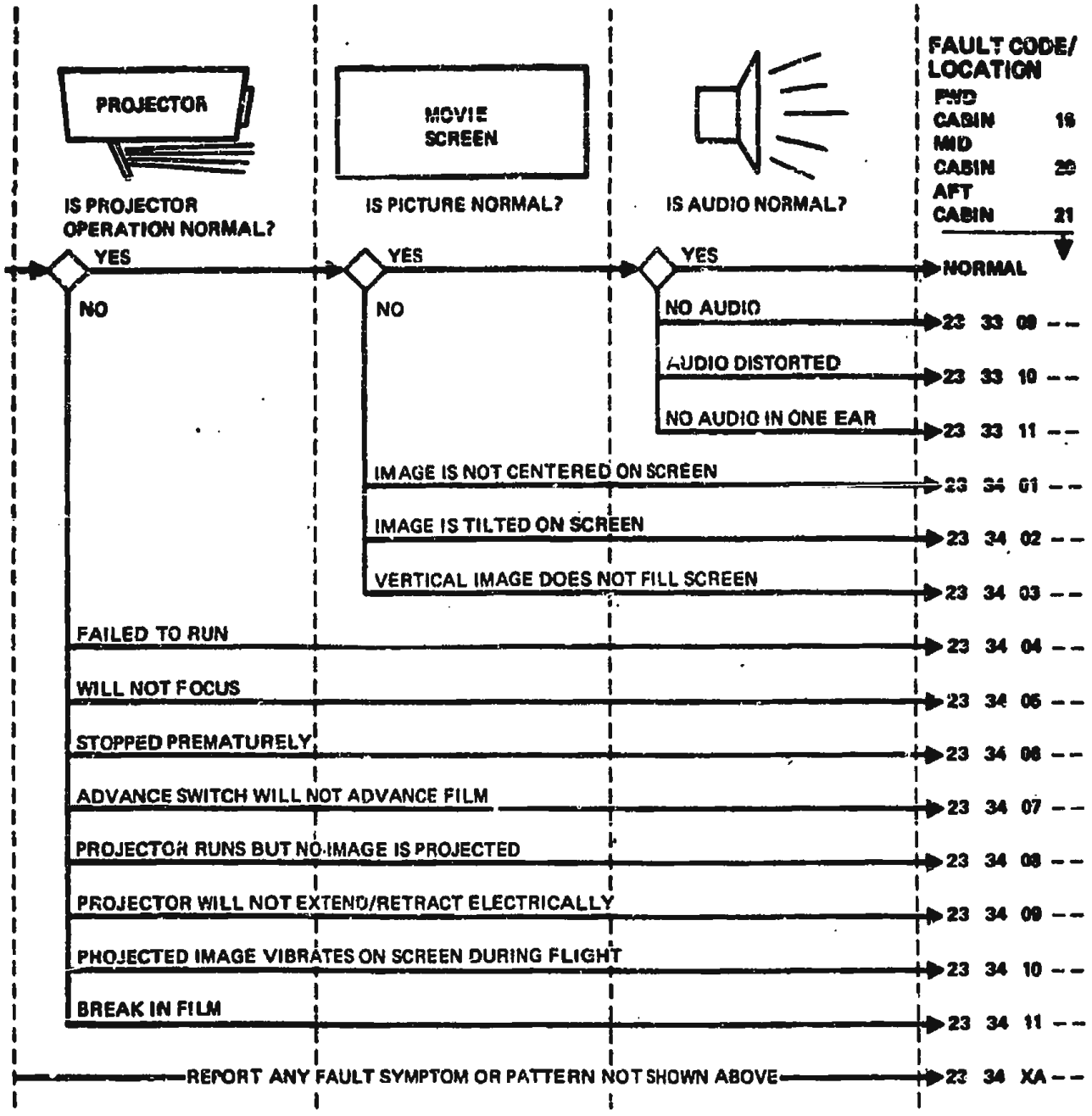
Passenger Audio Entertainment - Fault Codes
Figure 10


PROJECTOR
MOVIE SCREEN
IS PROJECTOR OPERATION NORMAL?
IS PICTURE NORMAL?
IS AUDIO NORMAL?
FAULT CODE/ LOCATION
FWD CABIN 19
MID CABIN 20
AFT CABIN 21
YES
NO
NORMAL
NO AUDIO 23 33 09 - -
AUDIO DISTORTED 23 33 10 - -
NO AUDIO IN ONE EAR 23 33 11 - -
IMAGE IS NOT CENTERED ON SCREEN 23 34 01 - -
IMAGE IS TILTED ON SCREEN 23 34 02 - -
VERTICAL IMAGE DOES NOT FILL SCREEN 23 34 03 - -
FAILED TO RUN 23 34 04 - -
WILL NOT FOCUS 23 34 05 - -
STOPPED PREMATURELY 23 34 06 - -
ADVANCE SWITCH WILL NOT ADVANCE FILM 23 34 07 - -
PROJECTOR RUNS BUT NO IMAGE IS PROJECTED 23 34 08 - -
PROJECTOR WILL NOT EXTEND/RETRACT ELECTRICALLY 23 34 09 - -
PROJECTED IMAGE VIBRATES ON SCREEN DURING FLIGHT 23 34 10 - -
BREAK IN FILM 23 34 11 - -
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE 23 34 XA - -

APPLICABLE CIRCUIT BREAKERS

LH GALLEY CB PANEL

11D, 12D, AND 19D	MOVIE PROJECTOR NO. 1
7D, 9D, AND 20D	MOVIE PROJECTOR NO. 2
5D, 6D, AND 21D	MOVIE PROJECTOR NO. 3

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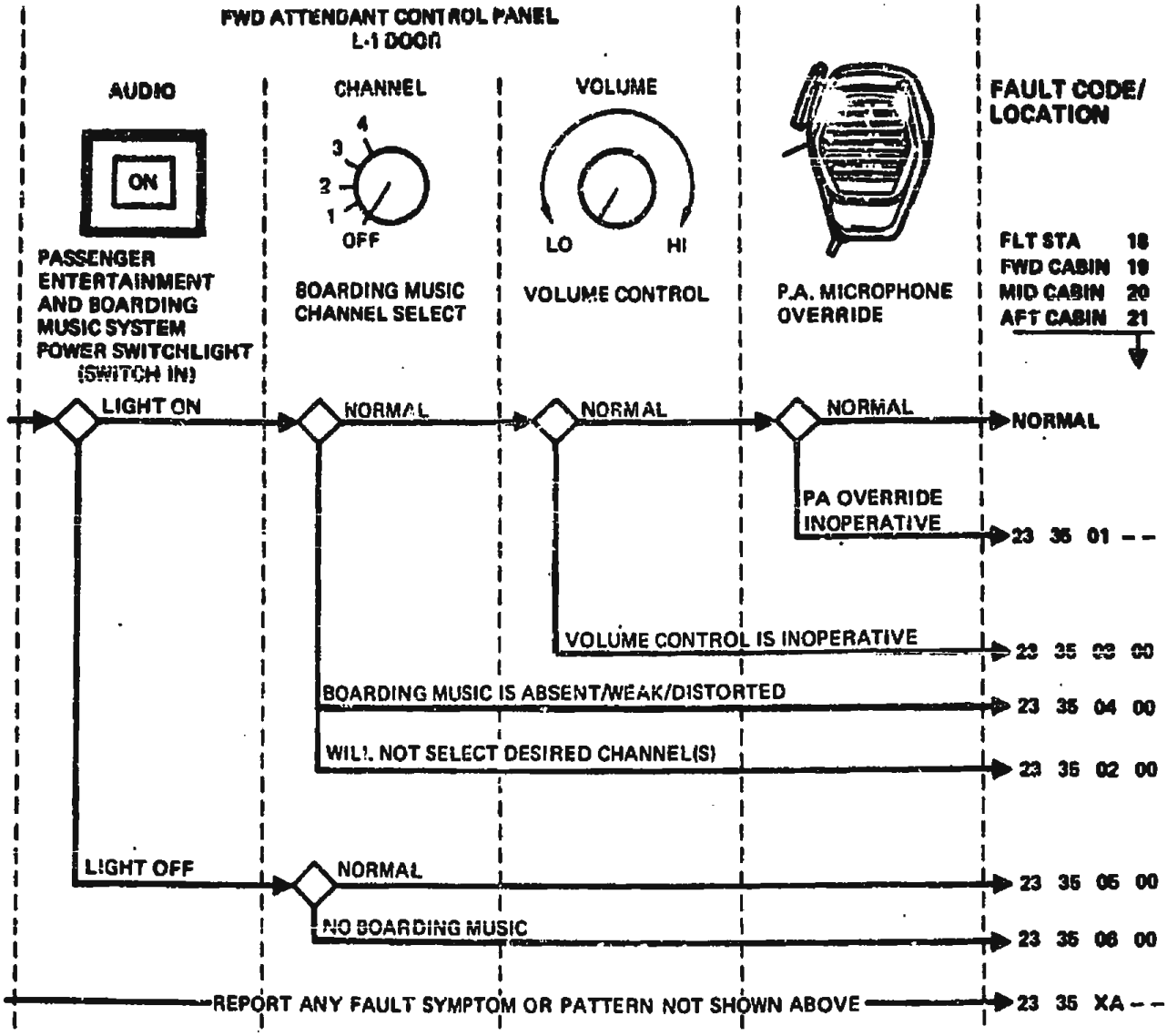
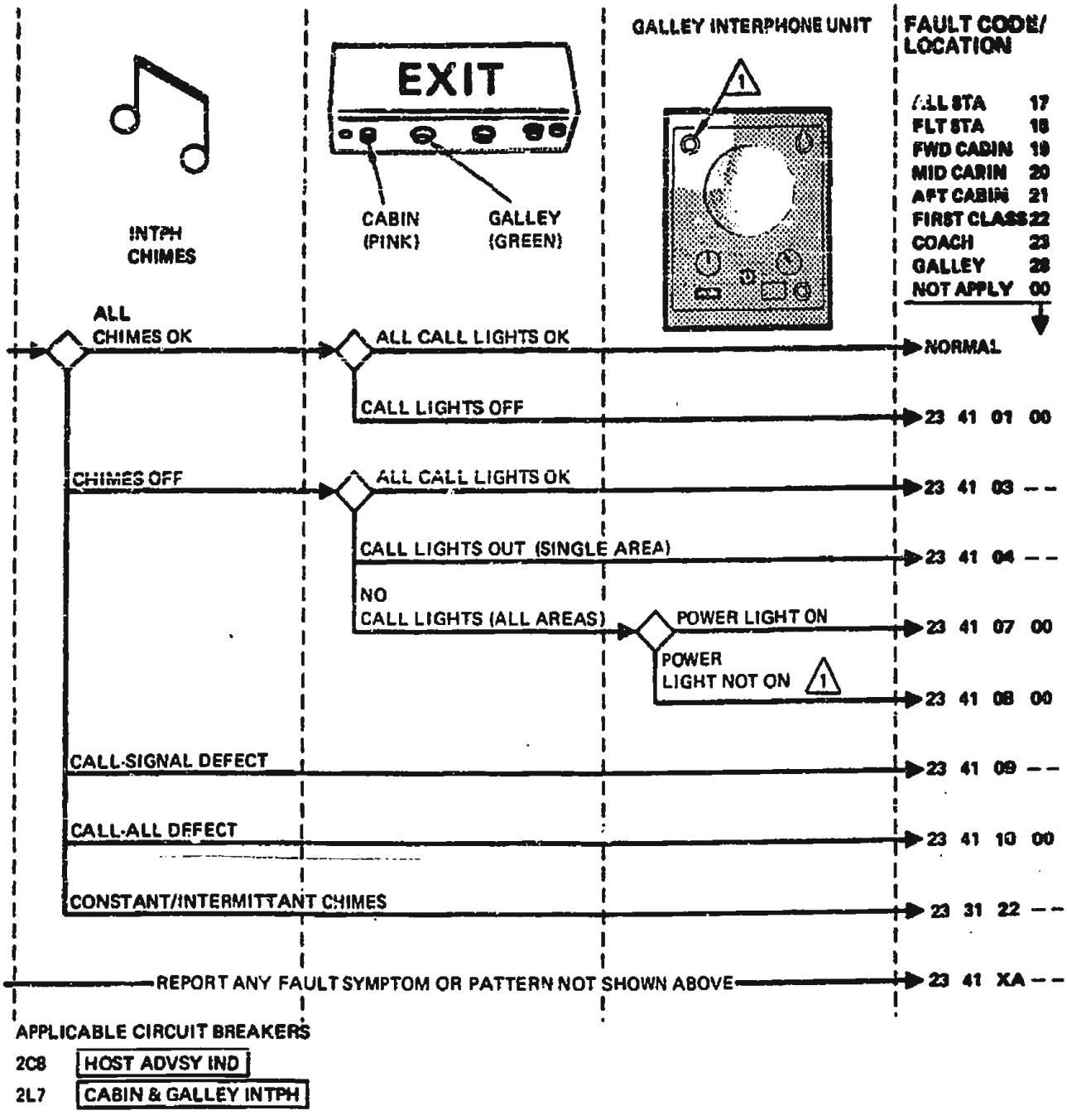
Passenger Visual Entertainment - Fault Codes
Figure 11



ED1-0003-23-060

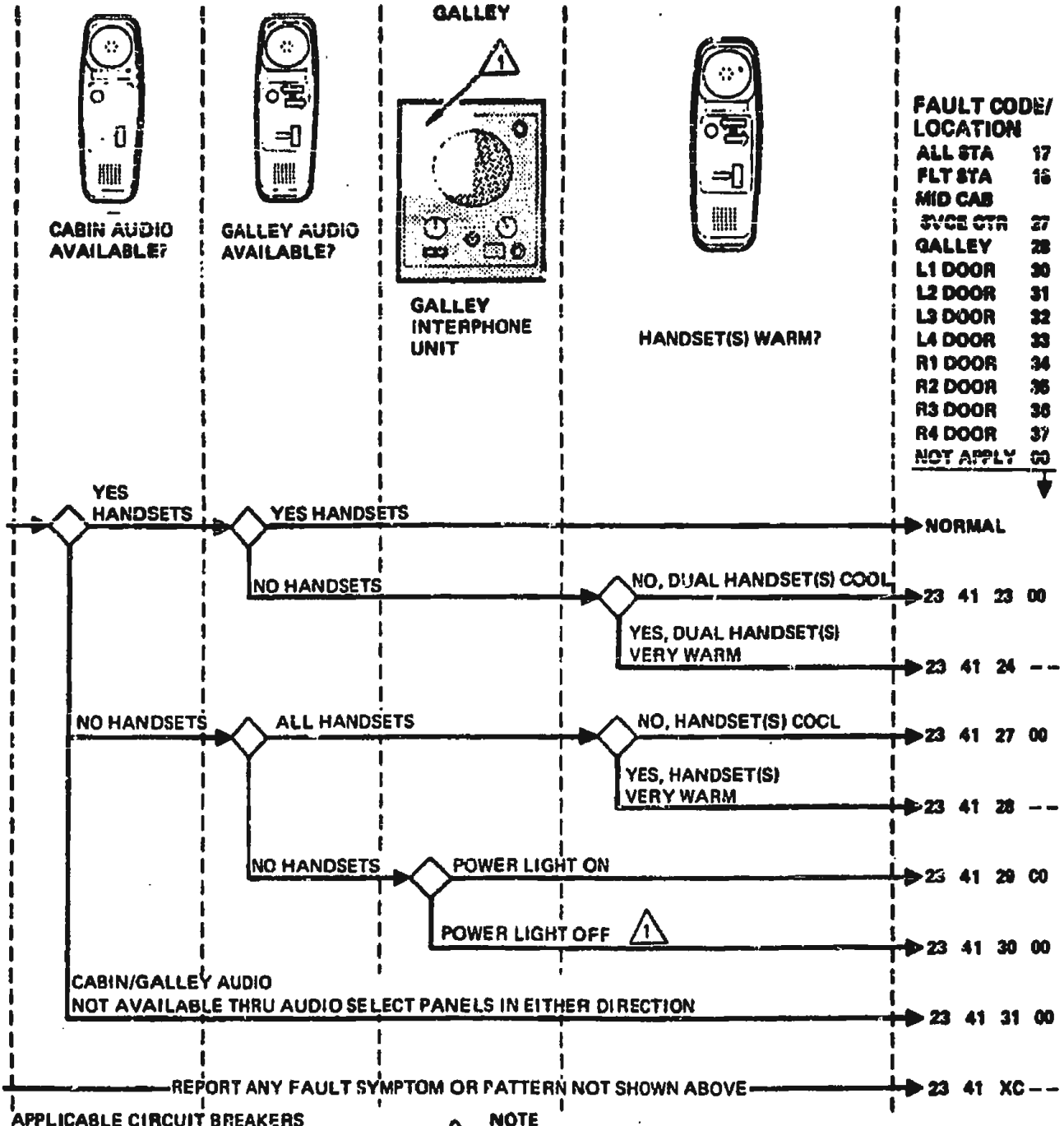
Boarding Music - Fault Codes
Figure 12



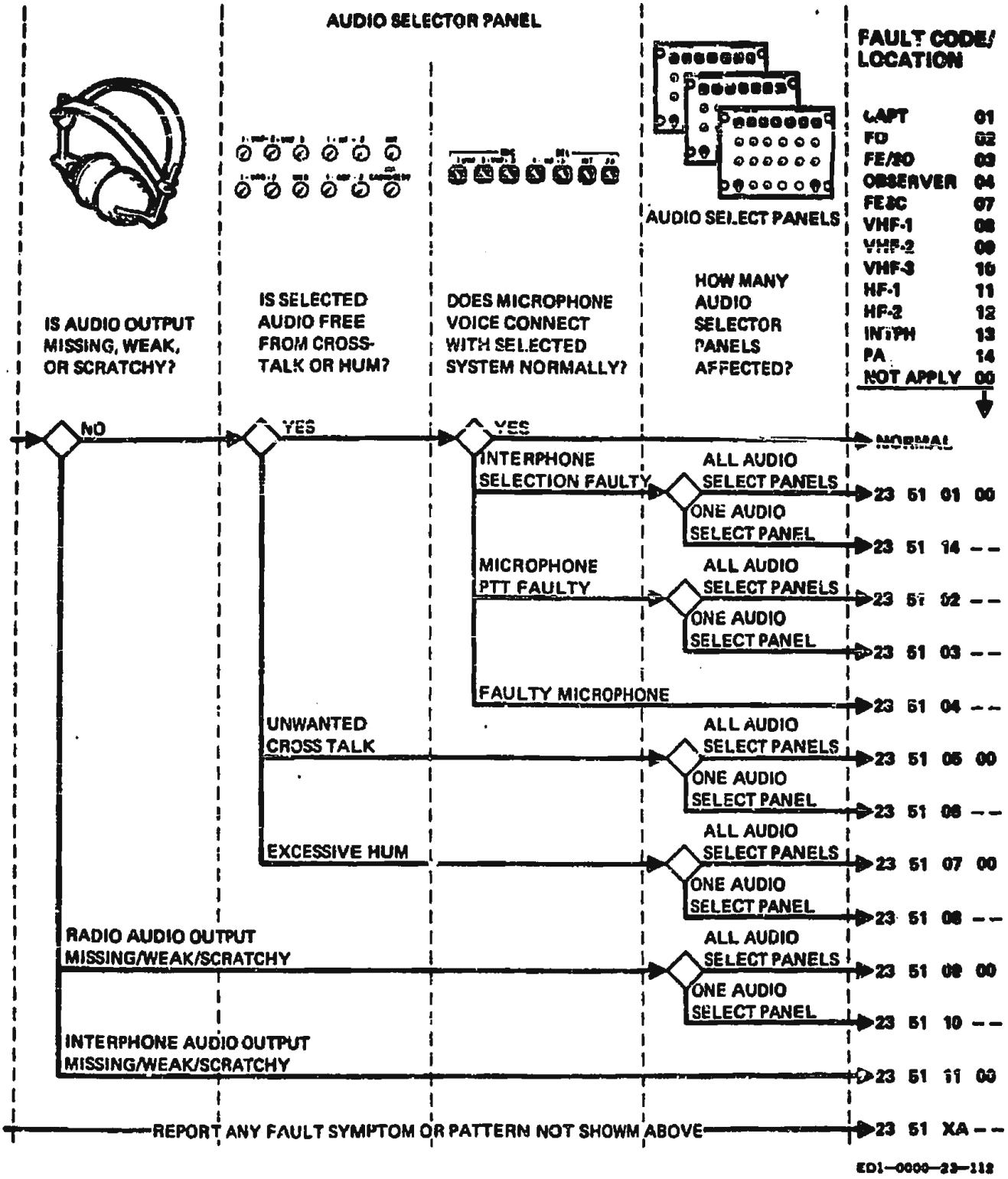
1 NOTE
GALLEY INTPH UNIT IS AVAIL IN 2 CONFIGS; WITH "POWER" LIGHT OR "RESET POWER" SWITCHLIGHT. RESETTING SWITCHLIGHT MAY RESTORE SERVICE IF FAULT WAS INTERMITTENT

ED1-0008-23-008

Flt Sta, Cabin/Galley Intph Chime/Call Light - Fault Codes
Figure 13



Cabin, Galley Intph Audio - Fault Codes
Figure 14



Audio Integrating System - Fault Codes
Figure 15

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 11 XA __	1. An HF Communications fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-11-00 Fig. 103 Block 1 23-11-00 Fig. 104 Block 1 23-11-00 Fig. 105 Block 1
23 22 XA __	1. A SELCAL fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-22-00 Fig. 103 Block 1
23 23 XA __	1. A VHF Communications fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-23-00 Fig. 103 (Sheet 1) Block 1
R 23 24 XA __	1. An ACARS INOPERATIVE, LINK TEST-FAULT CODES fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 23-24-00 Fig. 103 Block 1
R 23 24 XB 00	1. An ACARS DATA MODE - FAULT CODES fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 23-24-00 Fig. 103 Block 1
R 23 24 XC 00	1. An ACARS VOICE MODE - FAULT CODES fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 23-24-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
R 23 24 XD __	1. An ACARS DATA DISPLAY/DATA ENTRY/PANEL LGT - FAULT CODES fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 23-24-00 Fig. 103 Block 1
23 31 XA __	1. A Passenger Address System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 23-31-00 Fig. 103, thru Fig. 111 Block 1
23 33 XA __	1. A Passenger Services fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-33-00 Fig. 106, 107, 108, 109, 115, 117 and 118 Block 1
23 33 XB __	1. A Passenger Audio Entertainment fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-33-00 Fig. 103, 110, 111, 112, 113, 114 and 116 Block 1
23 34 XA __	1. A Passenger Visual Entertainment fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 23-34-00 Fig. 103 Block 1 23-34-00 Fig. 104 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 35 XA __	1. A Boarding Music fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 23-35-00 Fault Isolation
23 41 XA __	1. A Flt Sta, Cabin/Galley Intph Chime/Call Light fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 23-41-00 Fig 103,104 and 105 Block 1 (001-031) 23-41-00 Fig 103,104,107 and 108 Block 1 (032-999)
23 41 XC __	1. A Cabin, Galley Intph Audio fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 23-41-00 Fig 106,107 and 108 Block 1 (001-031) 23-41-00 Fig 105,106 and 109 Block 1 (032-999)
23 51 XA __	1. An Audio Integrating System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 23-51-00 Fig. 103, 104, 105, 106 and 107 Block 1
23 11 01 __	1. (11=HF 1, 12=HF 2) Weak transmitter output or no output. 2. 23-11-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 11 02 __	1. (11=HF 1, 12=HF 2) transmitter will not key. Check Audio Select Panel microphone select switch.
	2. 23-11-00 Fig. 103 Block 1
23 11 03 __	1. (11=HF 1, 12=HF 2) transmitter will not key. Mic select switch OK.
	2. 23-11-00 Fig. 103 Block 1
23 11 04 __	1. (11=HF 1, 12=HF 2) transceiver does not tune correctly.
	2. 23-11-00 Fig. 104 Block 1
23 11 05 __	1. (11=HF 1, 12=HF 2) control panel mode selector fails to select correct mode.
	2. 23-11-00 Fig. 104 Block 1
23 11 06 __	1. (11=HF 1, 12=HF 2) RF sensitivity is faulty.
	2. 23-11-00 Fig. 104 Block 1
23 11 07 __	1. (11=HF 1, 12=HF 2) no reception.
	2. 23-11-00 Fig. 105 Block 1
23 11 08 __	1. (11=HF 1, 12=HF 2) reception weak, Audio Select Panel controls function OK.
	2. 23-11-00 Fig. 105 Block 1
23 11 09 __	1. (11=HF 1, 12=HF 2) Audio Select Panel controls are faulty.
	2. 23-11-00 Fig. 105 Block 1
23 11 10 __	1. (11=HF 1, 12=HF 2) SELCAL fails to signal.
	2. 23-11-00 Fig. 103 Block 1 23-22-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 22 01 __	1. (15=SELCAL 1, 16=SELCAL 2) chime and control panel lamp will not reset.
	2. 23-22-00 Fig. 103 Block 8
23 22 02 00	1. SELCAL 1 and 2 chime and control panel lamp will not reset.
	2. 23-22-00 Fig. 103 Block 8
23 22 03 __	1. (15=SELCAL 1, 16=SELCAL 2) control panel lamp does not operate.
	2. 23-22-00 Fig. 103 Block 10
23 22 04 __	1. (15=SELCAL 1, 16=SELCAL 2) chime does not operate.
	2. 23-22-00 Fig. 103 Block 4
23 22 05 00	1. SELCAL 1 and 2 control panel lamps do not operate.
	2. 23-22-00 Fig. 103 Block 10
23 22 06 00	1. SELCAL 1 and 2 chimes do not operate.
	2. 23-22-00 Fig. 103 Block 4
23 23 01 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) radio check faulty.
	2. 23-23-00 Fig. 103 (Sheet 1) Block 1
23 23 02 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) control panel faulty. Receiver OK.
	2. 23-23-00 Fig. 103 (Sheet 1) Block 4

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 23 03 __	1. (01=Capt, 02=F/O, 03=FE/SO, 04=Obs., 07=FESC) audio selector panel faulty. Receiver and control panel OK.
	2. 23-23-00 Fig. 103 (Sheet 1) Block 5
23 23 04 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) receiver audio faulty. Squelch, control panel, audio selector panel no effect.
	2. 23-23-00 Fig. 103 (Sheet 1) Block 7
23 23 05 __	1. (01=Capt, 02=F/O, 03=FE/SO, 05=1st Obs., 06=2nd Obs.) microphone faulty. System OK.
	2. 23-23-00 Fig. 103 (Sheet 2) Block 2
23 23 06 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) control panel faulty. Transceiver OK.
	2. 23-23-00 Fig. 103 (Sheet 2) Block 3
23 23 07 __	1. (01=Capt, 02=F/O, 03=FE/SO, 04=Obs., 07=FESC) audio selector panel faulty. Transceiver and control panel OK.
	2. 23-23-00 Fig. 103 (Sheet 2) Block 4
23 23 08 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) transmission faulty. Microphone, control panel, audio selector panel no effect.
	2. 23-23-00 Fig. 103 (Sheet 2) Block 5
23 23 09 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) communications test noise faulty.
	2. 23-23-00 Fig. 103 (Sheet 1) Block 4

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 23 10 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) sidetone weak or missing. Sidetone normal with alternate TFR select. 2. 23-23-00 Fig. 103 (Sheet 2) Block 1
23 23 11 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) sidetone weak or missing. Sidetone normal with alternate audio selected. 2. 23-23-00 Fig. 103 (Sheet 2) Block 1
23 23 12 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) sidetone weak or missing. Sidetone faulty with alternate audio selected. 2. 23-23-00 Fig. 103 (Sheet 2) Block 1
23 23 13 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) TFR FREQ SEL weak or not present. 2. 23-23-00 Fault Isolation
23 23 14 __	1. (08=VHF 1, 09=VHF 2, 10=VHF 3) SELCAL fails to signal. 2. 23-23-00 Fig. 103 Block 1
23 24 01 00	1. SELCAL-2 Light fails to illum. Chime fails to sound during ACARS Link Test. 2. 23-24-02 MM, Replace AIDS/ACARS CEU.
23 24 02 00	1. MU FAIL remain illum after ACARS Link Test. 2. 23-24-02 MM, Replace AIDS/ACARS CEU.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 24 03 00	1. CU FAIL remain illum after ACARS Link Test.
	2. 23-24-01 MM, Replace ACARS Control Unit.
23 24 04 00	1. SEND fails to illum during ACARS Link Test.
	2. 23-24-01 MM, Replace ACARS Control Unit. 23-24-01, Replace AIDS/ACARS CEU, if fault persi
23 24 05 00	1. MU FAIL illum. SEND fails to illum during ACARS Link Test.
	2. 23-24-01 MM, Replace ACARS Control Unit.
23 24 06 00	1. CU FAIL illum. SEND fails to illum during ACARS Link Test.
	2. 23-24-01 MM, Replace ACARS Control Unit.
23 24 07 __	1. (04=L, 05=R) alpha/numeric segments fail to illum during ACARS Link Test.
	2. 23-24-00 Fig. 103 Block 1
23 24 08 __	1. (07=individual, 08=All) Lgt sgments were missing during ACARS Link Test. (Specifiy Lgt segment(s)).
	2. 23-24-00 Fig. 103 Block 1
23 24 09 00	1. NOT USED.
23 24 10 __	1. (01=Individual, 02=Upper, 03=Lower, 06=All) Lgt(s) failed to illum during ACARS Link Test. (Specify Lgt(s)).
	2. 23-24-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
R 23 24 11 00	1. Alpha/numeric display erratic. ACARS in data mode.
R	2. 23-24-00 Fig. 103 Block 1
R 23 24 12 00	1. MU FAIL illum. ACARS in data mode.
R	2. 23-24-02 MM, Replace AIDS/ACARS CEU.
R 23 24 13 00	1. CU FAIL illum. ACARS in data mode.
R	2. 23-24-01 MM, Replace ACARS Control Unit.
R 23 24 14 00	1. SEND fails to illum. ACARS in data mode.
R	2. 23-24-00 Fig. 103 Block 1
R 23 24 15 00	1. SEND fails to illum. MU FAILS to illum. ACARS in data mode.
R	2. 23-24-02 MM, Replace AIDS/ACARS CEU.
R 23 24 16 00	1. SEND fails to illum. CU FAILS TO illum. ACARS in data mode.
R	2. 23-24-01, Replace AIDS/ACARS CEU.
R 23 24 17 00	1. VOX MODE fails to extin when DATA MODE is pressed on ACARS Control Unit.
R	2. 23-24-02 MM, Replace AIDS/ACARS CEU. 23-24-01 MM, Replace ACARS Control Unit, if faul

FAULT CODE INDEX
TABLE 1 (CONTINUED)

	FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
R	23 24 18 00	1. SELCAL-2 light fails to extin when pressed. VOX MODE extin when ACRAS MODE is pressed.
R		2. 23-24-02 MM, Replace AID/ACARS CEU. 23-22-02 MM, Replace SELCAL Control, if fault pe
R	23 24 19 00	1. SELCAL-2 light fails to extin when pressed. VOX MODE fails to extin when ACARS DATA MODE is pressed.
R		2. 23-24-02 MM, Replace AIDS/ACARS CEU.
R	23 24 20 00	1. SELCAL-2 light fails to illum and chime fails to sound when call received.
R		2. 23-24-02 MM, Replace AIDS/ACARS cEU.
R	23 24 21 00	1. VOX MODE fails to flash and then go steady when call received. SELCAL-2 light illum and chime sounds.
R		2. 23-24-02 MM, Replace AID/ACARS CEU. 23-24-01 MM, Replace ACARS Control Unit, if faul
R	23 24 22 00	1. VOX MODE fails to flash and then go steady when call received. SELCAL-2 light fails to illum. Chime fails to sound.
R		2. 23-24-02 MM, Replace AIDS/ACARS CEU.
	23 24 23 00	1. NOT USED.
	23 24 24 00	1. NOT USED.
	23 24 25 00	1. NOT USED.
	23 24 26 00	1. NOT USED.
	23 24 27 00	1. NOT USED.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 24 28 00	1. NOT USED.
23 24 29 00	1. Dept. sta entry on ACARS is (describe problem; 1st letter fails to advance, cycles through alphabet, display blank, intermittent, etc). 2. 23-24-00 Fig. 103 Block 1
23 24 30 00	1. Dest. sta entry on ACARS is (describe problem; 1st letter fails to advance, cycles through alphabet, display blank, intermittent, etc). 2. 23-24-00 Fig. 103 Block 1
23 24 31 00	1. GMT on ACARS is blank. 2. 23-24-00 Fig. 103 Block 1
23 24 32 00	1. GMT on ACARS is erratic. 2. 23-24-02 MM, Replace AIDS/ACARS CEU.
23 24 33 00	1. GMT on ACARS resets in flight. 2. 23-24-02 MM, Replace AIDS/ACARS CEU.
23 24 34 00	1. GMT on ACARS is incorrect after update. 2. 23-24-00 Fig. 103 Block 1
23 24 35 __	1. (01=FLT NO, 02=FUEL, 03=DLA, 04=GND ADRS, 05=CODE, 06=MISC, 07=Number___, 08=ALL) data entry key(s) on ACARS (is,are) intermittent. 2. 23-24-00 Fig. 103 Block 1
23 24 36 __	1. Unable to enter data on ACARS with (01=FLT NO, 02=FUEL, 03=DLA, 04=GND ADRS, 05=CODE, 06=MISC, 07=Number___, 08=ALL) data entry key(s). 2. 23-24-00 Fig. 103 Block 1
23 24 37 00	1. NOT USED.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 24 38 00	1. NOT USED.
23 24 39 00	1. NOT USED.
23 24 40 00	1. NOT USED.
23 24 41 00	1. NOT USED.
23 24 42 00	1. NOT USED.
23 24 43 00	1. NOT USED.
23 24 44 00	1. NOT USED.
23 24 45 00	1. NOT USED.
23 24 46 00	1. NO COMM light on ACARS remains illum. 2. 23-24-00 Fig. 103 Block 1
23 24 47 00	1. ACARS inop. No panel lights displayed, etc. 2. 23-24-02 MM, Replace AID/ACARS CEU. 23-24-01 MM, Replace ACARS Control Unit, if faul
23 24 48 00	1. NOT USED.
23 24 49 00	1. NOT USED.
23 24 50 00	1. NOT USED.
23 24 51 00	1. NOT USED.
23 24 52 00	1. NOT USED.
23 24 53 00	1. NOT USED.
23 24 54 00	1. NOT USED.
23 24 55 00	1. NOT USED.
23 24 56 00	1. NOT USED.
23 24 57 00	1. NOT USED.

R EFFECTIVITY: ALL
R
050B

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 24 58 00	1. NOT USED.
23 24 59 00	1. NOT USED.
23 24 60 00	1. ACARS panel brightness cont (Lgt(s) inop, knob(s) loose, etc). 2. 23-24-01 MM, Replace ACARS Control Unit.
23 24 61 00	1. NOT USED.
23 24 62 00	1. NOT USED.
23 24 63 00	1. NOT USED.
23 24 64 00	1. NOT USED.
23 24 65 00	1. NOT USED.
23 24 66 00	1. NOT USED.
23 24 67 00	1. NOT USED.
23 24 68 00	1. NOT USED.
23 24 69 00	1. NOT USED.
23 24 70 00	1. NOT USED.
23 24 71 00	1. NOT USED.
23 24 72 00	1. NOT USED.
23 24 73 00	1. NOT USED.
23 24 74 00	1. NOT USED.
23 24 75 00	1. NOT USED.
23 24 76 00	1. NOT USED.
23 24 77 00	1. NOT USED.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 24 78 00	1. ACARS Data Entry Panel (identify switch) has mechanical malfunction (Describe). 2. 23-24-01 MM, Replace ACARS Control Unit.
23 31 01 00	1. No HI chime when CALL SIGNAL is activated on flight station cabin interphone control unit. 2. 23-31-00 Fig. 103 Block 1
23 31 02 00	1. No LO chime when ordinance lights activated/deactivated. 2. 23-31-00 Fig. 103 Block 1
23 31 03 00	1. PA output is weak or there is no output. 2. 23-31-00 Fig. 104 Block 1
23 31 04 00	1. PA output is weak or no output in coach, OK in first class. 2. 23-31-00 Fig. 104 Block 1
23 31 05 00	1. PA output is weak or no output in first class, OK in coach. 2. 23-31-00 Fig. 104 Block 1
23 31 06 00	1. NOT USED.
23 31 07 00	1. NOT USED.
23 31 08 00	1. PA output does not decrease after landing. 2. 23-31-00 Fig. 105 Block 1
23 31 09 00	1. PA output does not increase after takeoff. 2. 23-31-00 Fig. 105 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 31 10 00	1. PA too loud.
	2. 23-31-00 Fig. 106 Block 1
23 31 11 00	1. Flight Station area select faulty (denote first class and/or coach areas).
	2. 23-31-00 Fig. 109 Block 1
23 31 12 00	1. Forward cabin attendant area select faulty.
	2. 23-31-00 Fig. 109 Block 1
23 31 13 00	1. Mid cabin service area select is faulty (denote first class and/or coach areas).
	2. 23-31-00 Fig. 109 Block 1
23 31 14 00	1. Aft cabin attendant area select faulty.
	2. 23-31-00 Fig. 109 Block 1
23 31 15 00	1. VU meter does not operate.
	2. 23-31-00 Fig. 110 Block 1
23 31 16 00	1. PA IN USE light does not come on.
	2. 23-31-00 Fig. 110 Block 1
23 31 17 __	1. (17=ALL STA, 18=FLT STA, 19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) Mic does not operate PA.
	2. 23-31-00 Fig. 107 Block 1
23 31 18 __	1. (17=ALL STA, 18=FLT STA, 19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) PA keyed by microphone, loud squealing and/or no audio output.
	2. 23-31-00 Fig. 107 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 31 19 __	1. (17=ALL STA, 18=FLT STA, 19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) PA does not override Boarding Music.
	2. 23-31-00 Fig. 108 Block 1
23 31 20 00	1. PA monitor audio weak or missing in flight station. OK in cabin areas.
	2. 23-31-00 Fig. 104 Block 1
23 31 21 00	1. PA selected on audio select panel, no headset sidetone.
	2. 23-31-00 Fig. 111 Block 1
23 31 22 __	1. (17=All Sta, 18=Flt Sta, 22=First Class, 23=Coach, 28=Galley) interphone chimes sound constantly/intermittently.
	2. 23-31-00 Fig. 103 Block 1
23 33 01 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN, 22=FIRST CLASS) chime operation abnormal, i.e. chimes intermittent, constant, inoperative.
	2. 23-33-00 Fig. 108, 117, 118 Block 1
23 33 02 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN, 22=FIRST CLASS) call light operation abnormal, i.e. Call lights flashing, fail to come on, fail to go off.
	2. 23-33-00 Fig. 107, 108, 109 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 33 03 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN, 22=FIRST CLASS) reading light operation abnormal, i.e. read lights flashing, fail to come on, fail to go off. 2. 23-33-00 Fig. 105, 106, 115 Block 1
R 23 33 04 __ R R R	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN, 22=FIRST CLASS) individual air outlet operation abnormal; i.e., constant clicking, unable to adjust to desired setting, inoperative. 2. 23-33-00 Fig. 105 Block 1
23 33 05 __	1. (17=ALL STA, 19=FWD CABIN, 21=AFT CABIN, 24=ONE SEAT GROUP, 25=SEAT COLUMN) audio not being received. 2. 23-33-00 Fig. 116 Block 1
23 33 06 __	1. (17=ALL STA, 19=FWD CABIN, 21=AFT CABIN, 24=ONE SEAT GROUP, 25=SEAT COLUMN) audio received is noisy/distorted. 2. 23-33-00 Fig. 119 Block 1
23 33 07 __	1. (17=ALL STA, 19=FWD CABIN, 21=AFT CABIN, 24=ONE SEAT GROUP, 25=SEAT COLUMN) different audio program being received in each ear. 2. 23-33-00 Fig. 114 Block 1
23 33 08 __	1. (17=ALL STA, 19=FWD CABIN, 21=AFT CABIN, 24=ONE SEAT GROUP, 25=SEAT COLUMN) no audio entertainment. 2. 23-33-00 Fig. 116 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 33 09 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector appears to operate normally, however, no audio is received at passenger seats. (Give seat column(s) affected). 2. 23-33-00 Fault Isolation 23-34-00 Fig. 103 Block 1
23 33 10 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector appears to operate normally, however, audio is distorted/poor quality at passenger seats. (Give seat column(s) affected). 2. 23-33-00 Fig. 103 (Sheet 1) Block 1 23-33-00 Fig. 103 (Sheet 2) Block 1
23 33 11 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector appears to operate normally, however, audio not being heard in one ear at passenger seats. (Give seat column(s)/number(s) affected). 2. 23-33-00 Fig. 103 (Sheet 1) Block 1 23-33-00 Fig. 103 (Sheet 2) Block 1
23 34 01 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projected image not centered on screen. 2. 23-34-00 Fig. 103 Block 1
23 34 02 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projected image tilted on screen. 2. 23-34-00 Fig. 103 Block 1
23 34 03 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projected image does not fill screen vertically. 2. 23-34-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 34 04 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector fails to operate.
	2. 23-34-00 Fig. 103 Block 1
23 34 05 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projected image will not focus on screen correctly, no focus control.
	2. 23-34-00 Fig. 103 Block 1
23 34 06 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector ceased to operate after partial display of film.
	2. 23-34-00 Fig. 103 Block 1
23 34 07 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) depressing ADVANCE control on projector fails to advance film.
	2. 23-34-00 Fig. 103 Block 1
23 34 08 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector operates, however, no projected image displayed.
	2. 23-34-00 Fig. 103 Block 1
23 34 09 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projector fails to extend/retract electrically.
	2. 23-34-00 Fig. 103 Block 1
23 34 10 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) projected image vibrates.
	2. 23-34-00 Fig. 104 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 34 11 __	1. (19=FWD CABIN, 20=MID CABIN, 21=AFT CABIN) break in film.
	2. 23-34-00 Fig. 103 Block 1
23 35 01 __	1. (18=Flt Sta, 19=Fwd Cabin, 20=Mid Cabin, 21=Aft Cabin) PA will not override boarding music when announcement is made.
	2. 23-35-00 Fault Isolation
23 35 02 00	1. Boarding music channel select switch will not select desired channel.
	2. 23-35-00 Fault Isolation, SCHEM 1
23 35 03 00	1. Boarding music volume control is inoperative.
	2. 23-35-00 Fault Isolation
23 35 04 00	1. Boarding music is (absent, weak, distorted).
	2. 23-35-00 Fault Isolation
23 35 05 00	1. Boarding music is normal, system power light out with switch latched in.
	2. 23-35-00 Fault Isolation
23 35 06 00	1. Boarding music is inoperative, system power light out with switch latched in.
	2. 23-35-00 Fault Isolation

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 41 01 00	1. Interphone call light(s) off. Interphone chimes OK. 2. 23-41-00 Fault Isolation
23 41 02 00	1. NOT USED.
23 41 03 __	1. (18=Flt Sta, 22=First Class, 23=Coach, 28=Galley) interphone chimes do not sound. All call lights OK. 2. 23-41-00 Fault Isolation
23 41 04 __	1. (18=Flt Sta, 22=First Class, 23=Coach, 28=Galley) interphone chimes do not sound and call lights off. 2. 23-41-00 Fig. 103 Block 1
23 41 05 00	1. NOT USED.
23 41 06 00	1. NOT USED.
23 41 07 00	1. Interphone chimes do not sound in any area. All call lights inoperative. Galley interphone unit POWER light on. 2. 23-41-00 Fig. 103 Block 2 (W/O SB23-031) 23-41-00 Fig. 103 Block 2 (W/ SB23-031)
23 41 08 00	1. Interphone chimes do not sound in any area. All call lights inoperative. Galley interphone unit POWER light off. 2. 23-41-00 Fig. 103 Block 1 (W/O SB23-031) 23-41-00 Fig. 103 Block 1 (W/ SB23-031)

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 41 09 __	1. (17=All Sta, 18=Flt Sta, 22=First Class, 23=Coach, 28=Galley) interphone chimes do not sound when CALL - SIGNAL is depressed.
	2. 23-41-00 Fig. 104 Block 4
23 41 10 00	1. Interphone chimes do not sound three times, when CALL - ALL is depressed. Cabin interphone call lights do not blink twice and come on steady.
	2. 23-41-00 Fig. 103 Block 1
23 41 11 00	1. NOT USED.
23 41 12 00	1. NOT USED.
23 41 13 00	1. NOT USED.
23 41 14 00	1. NOT USED.
23 41 15 00	1. NOT USED.
23 41 16 00	1. NOT USED.
23 41 17 00	1. NOT USED.
23 41 18 00	1. NOT USED.
23 41 19 00	1. NOT USED.
23 41 20 00	1. NOT USED.
23 41 21 00	1. NOT USED.
23 41 22 00	1. NOT USED.
23 41 23 00	1. No or garbled galley interphone audio at all positions. All dual handsets feel normal, not hot. Cabin interphone audio OK.
	2. 23-41-00 Fig. 107 Block 3

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 41 24 __	1. (27=Mid Cab Svce Ctr, 30=L1 Door, 37=R4 Door) dual handset very warm to touch. No or garbled galley interphone audio at all positions.
	2. 23-41-00 Fig. 107 Block 6
23 41 25 00	1. NOT USED.
23 41 26 00	1. NOT USED.
23 41 27 00	1. No or garbled cabin interphone audio at all positions. All handsets feel normal, not hot. Galley interphone audio OK.
	2. 23-41-00 Fig. 106 Block 2
23 41 28 __	1. (27=Mid Cab Svce Ctr, 28=Galley, 30=L1 Door, 31=L2 Door, 32=L3 Door, 33=L4 Door, 34=R1 Door, 35=R2 Door, 36=R3 Door, 37=R4 Door) handset very warm to touch. No or garbled cabin interphone audio at all positions.
	2. 23-41-00 Fig. 106 Block 5 (W/O SB23-031) 23-41-00 Fig. 106 Block 6 (W/ SB23-031)
23 41 29 00	1. No or garbled cabin/galley interphone audio at (any, all) positions. Galley interphone unit POWER light on.
	2. 23-41-00 Fig. 106 Block 2
23 41 30 00	1. No or garbled cabin/galley interphone audio at (any, all) positions. Galley interphone unit POWER light off.
	2. 23-41-00 Fig. 105 Block 2
23 41 31 00	1. Cabin/galley audio not available thru Audio Select panels in either direction.
	2. 23-41-00 Fig. 108 Block 2

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 51 01 00	1. Interphone selection on all audio select panels faulty.
	2. 23-51-00 Fig. 103 Block 1
23 51 02 __	1. (08=VHF-1, 09=VHF-2, 10=VHF-3, 11=HF-1, 12=HF-2, 13=INTPH, 14=PA) microphone selection/PTT on all audio select panels faulty.
	2. 23-51-00 Fig. 104 Block 4
23 51 03 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Observer, 07=FESC) microphone selection/PTT on audio select panel faulty.
	2. 23-51-00 Fig. 104 Block 3
23 51 04 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Observer, 07=FESC) microphone on audio select panel faulty.
	2. 23-51-00 Fault Isolation.
23 51 05 00	1. Unwanted audio leak on all audio select panels.
	2. 23-51-00 Fig. 106 Block 6
23 51 06 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Observer, 07=FESC) unwanted audio leak on audio select panel.
	2. 23-51-00 Fig. 106 Block 5
23 51 07 00	1. Excessive hum on all audio select panels.
	2. 23-51-00 Fig. 106 Block 4
23 51 08 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Observer, 07=FESC) excessive hum on audio channel on audio select panel.
	2. 23-51-00 Fig. 106 Block 8

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
23 51 09 00	1. No received audio on audio channel, all audio select panels.
	2. 23-51-00 Fig. 103 (Sheet 2) Block 3
23 51 10 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Obsserver, 07=FESC) no received audio on audio channel on audio select panel.
	2. 23-51-00 Fig. 103 (Sheet 2) Block 4
23 51 11 00	1. No interphone audio (weak or scratchy).
	2. 23-51-00 Fault Isolation
23 51 12 00	1. NOT USED.
23 51 13 00	1. NOT USED.
23 51 14 __	1. (01=Capt, 02=FO, 03=FE/SO, 04=Observer, 07=FESC) interphone selection on audio select panel faulty.
	2. 23-51-00 Fig. 103 Block 1

COMMUNICATIONS - DESCRIPTION AND OPERATION

1. General

The aircraft communication facilities consist of the following:

R R	23-11-00	HF Communication System (Provisions only on aircraft 001-024 and 027)
R R	23-11-00	HF Communication System (Installed on aircraft 025, 026, and 028-999)
	23-22-00	SELCAL System
	23-23-00	VHF Communication System
	23-31-00	Passenger Address System
	23-33-00	Passenger Audio Entertainment and Services System
	23-34-00	Passenger Visual Entertainment System
	23-35-00	Boarding Music System
	23-41-00	Cabin and Galley Interphone System
	23-43-00	Service Interphone System
	23-45-00	Pilot/Mechanic Call System
	23-51-00	Audio Integrating System
	23-61-00	Static Discharging System
	23-71-00	Voice Recorder System

Figure 1 shows the major area locations for the communication system equipment. Figure 2 shows antenna and static discharger locations. Figure 3 illustrates bus power distribution through switching action initiated by Essential and No. 2 Master Radio Switches and Battery Switch. Communications systems primary power distribution through to the associated equipment circuit breaker is shown in Figure 4.

The communication equipment is located in the forward electronics service center, zones 112 and 113; the mid electrical service center, zone 137; the aft electronics equipment area, zone 164; the flight station, zone 210; and in the passenger compartment, lavatories, and maintenance areas.

Circuit breakers controlling communication system power are located on the pilots overhead circuit breaker panel CB1, zone 210; the Flight Engineer/Second Officers overhead and aft circuit breaker panels CB2 and CB3, zone 215; and the galley left and right circuit breaker panels, zone 131. Two MASTER RADIO switchlights, designated ESSENTIAL and NO. 2, are located on the pilots overhead panel, zone 210. Each switchlight controls power to the corresponding communication system ac and dc buses. This enables power to be supplied to essential systems during emergency power conditions (Ref. 24-31-00 and 24-51-00).

The communication systems provide the following capabilities:

CR A. On aircraft without HF Equipment installed,

Provisions for a dual HF communications system including antenna are installed. An HF antenna removal and installation procedure is included in this section of the manual (Ref. 23-11-00).

CR On aircraft with HF Equipment installed,

R The HF communication system is a dual system with a shared
R antenna. Each system is independent, providing long range
R voice communications between aircraft or aircraft and ground
R stations.

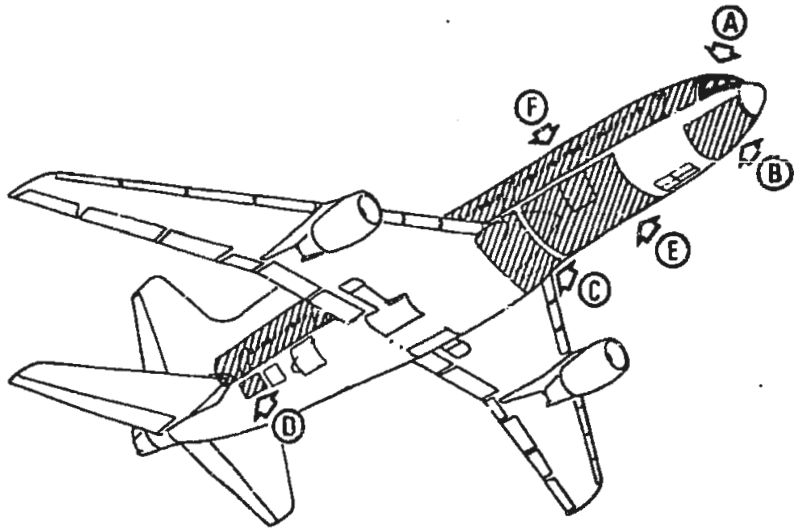
B. SELCAL (Selective Calling) System

CR The SELCAL system is a dual system which monitors HF
CR (aircraft with HF equipment installed), and VHF
CR communication system audio to detect radio calls directed to and encoded for a specific aircraft. If a radio signal containing the correct aircraft code is received by the
CR selected HF (aircraft with HF equipment installed), or VHF system, the SELCAL system provides steady light and repeating chime indications in the flight station.

R C. Very High Frequency (VHF) Communication System

R The VHF communication system consists of three transceivers with separate control panels and antennas, each capable of providing line-of-sight voice communication with other aircraft or ground stations. Both systems operate in the frequency range from 118.000 to 135.975 MHz in an AM mode. Automatic monitoring of preselected vhf channels is provided by the SELCAL system. VHF system audio is connected to the flight interphone and the voice recorder system through the audio integrating system.

D. Passenger Address (PA) System



Ⓐ
FLIGHT STATION

1 HF CONTROL PANELS (23-11-00) (PROVISIONS)
2 HF CONTROL PANEL (23-11-00) (INSTALLED)
SELCAL CONTROL PANEL (23-22-00)
VHF CONTROL PANELS (23-23-00)
PASSENGER ADDRESS SPEAKER (23-31-00)
PASSENGER ADDRESS CONTROL PANEL (23-31-00)
PASSENGER ADDRESS MICROPHONE (23-31-00)
PASSENGER ADDRESS VU METER (23-31-00)
CABIN INTERPHONE CONTROL PANEL (23-41-00)
CHIME SPEAKER UNIT (23-41-00)
INTERPHONE HANDSET (23-41-00)
AUDIO SELECTOR PANELS (23-51-00)
HEADSETS AND MICROPHONES (23-51-00)
HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLES (23-51-00)
MICROPHONE SELECTOR PANEL (23-51-00)
FLIGHT STATION SPEAKERS (23-51-00)
VOICE RECORDER CONTROL PANEL (23-71-00)

Ⓑ
FORWARD ELECTRONIC SERVICE CENTER

2 HF TRANSCEIVERS (23-11-00)
2 HF FAULT DETECTION PANEL (23-11-00)
SELCAL DECODER (23-22-00)
VHF TRANSCEIVERS (23-23-00)
PA AMPLIFIERS (23-31-00)
SERVICE INTERPHONE AMPLIFIER (23-43-00)
AUDIO SELECTOR PANEL (23-51-00)
AUDIO DISTRIBUTION UNIT (23-51-00)
FLIGHT INTERPHONE AMPLIFIER (23-51-00)

Ⓒ
MID ELECTRICAL SERVICE CENTER

AUDIO ENTERTAINMENT TAPE REPRODUCER (23-33-00)
MAIN MULTIPLEXER (23-33-00)
POWER SUPPLY (23-33-00)

NOTE
1 AIRCRAFT WITHOUT HF EQUIPMENT INSTALLED
2 AIRCRAFT WITH HF EQUIPMENT INSTALLED

Ⓓ
AFT ELECTRONIC EQUIPMENT AREA

VOICE RECORDER UNIT (23-71-00)

Ⓔ
GALLEY

PASSENGER ADDRESS SPEAKERS (23-31-00)
GALLEY INTERPHONE UNIT (23-41-00)
INTERPHONE HANDSET (23-41-00)
INTERPHONE SPEAKER (23-41-00)

Ⓕ
CABIN AREA

PASSENGER ADDRESS SPEAKERS (23-31-00)
CHIME SPEAKERS (23-31-00)
PASSENGER ADDRESS MICROPHONES (23-31-00)
VU METERS (23-31-00)
SEAT ELECTRONIC UNITS (23-33-00)
COMPARTMENT CONTROLLERS (23-33-00)
DECODERS (23-33-00)
MULTIPLEXER PSS/PES TEST PANEL (23-33-00)
SUBMULTIPLEXERS (23-33-00)
MOTION PICTURE PROJECTORS (23-34-00)
PROJECTOR CONTROLS (23-34-00)
BOARDING MUSIC CONTROLS (23-35-00)
INTERPHONE HANDSETS (23-41-00)

AIRCRAFT (GENERAL)

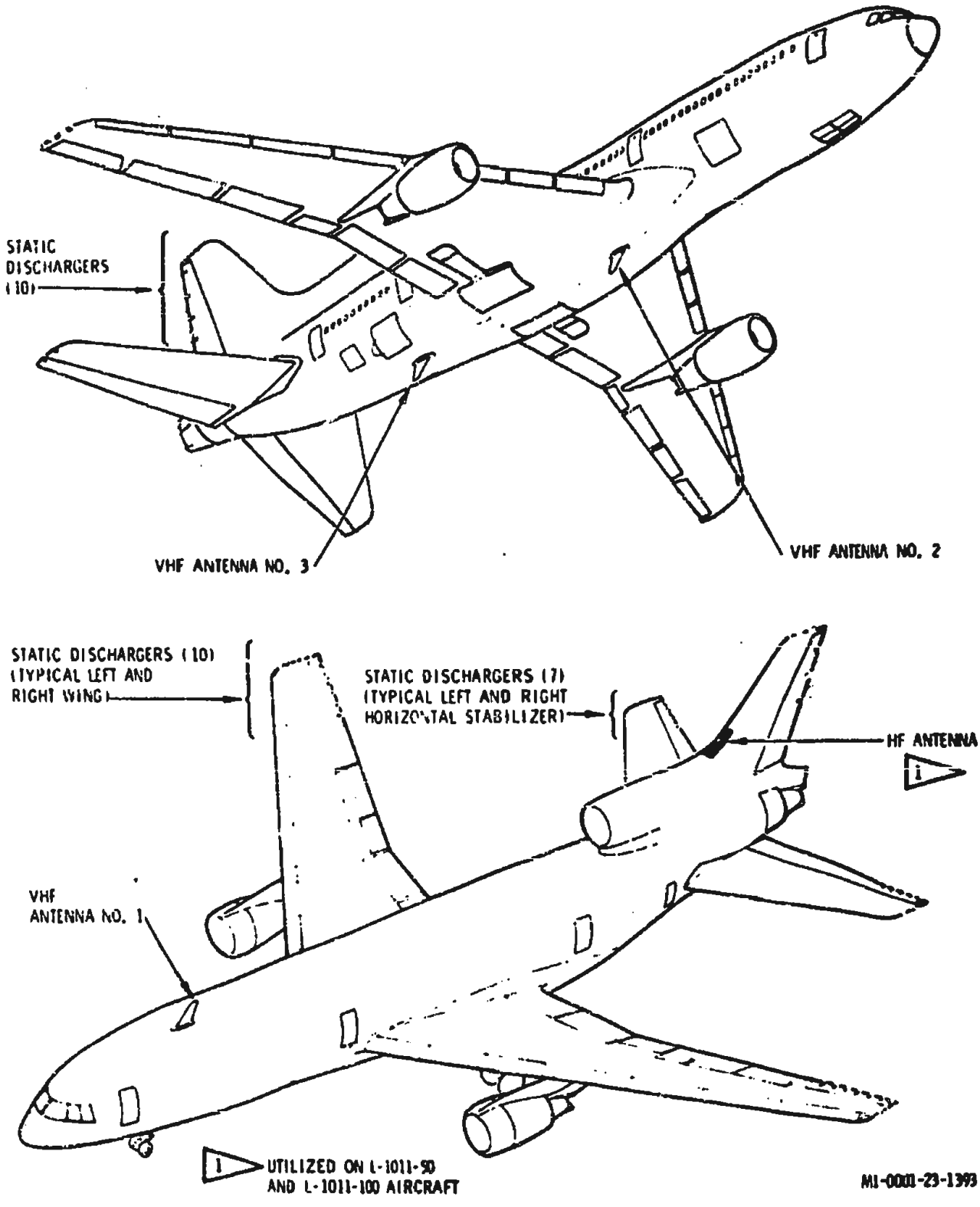
SERVICE INTERPHONE JACKS LOCATED IN UNDERFLOOR SERVICE AREA, WINGS, ENGINE AREAS, LANDING GEAR AREAS, AND VERTICAL STABILIZER (23-43-00).

M1-0006-23-163

CR Communication System Equipment Location
CR Figure 1

EFFECTIVITY: ALL

0018


STATIC DISCHARGERS (10)
VHF ANTENNA NO. 3
VHF ANTENNA NO. 2
STATIC DISCHARGERS (10) (TYPICAL LEFT AND RIGHT WING)
STATIC DISCHARGERS (7) (TYPICAL LEFT AND RIGHT HORIZONTAL STABILIZER)
HF ANTENNA
1
VHF ANTENNA NO. 1
1 UTILIZED ON L-1011-50 AND L-1011-100 AIRCRAFT
M1-0000-23-1393

CR Communication System Antenna and Static Discharger Locations
CR Figure 2

MASTER RADIO SWITCHES (1)		BATTERY SWITCH (2)	DC ESSENTIAL RADIO BUS	ESSENTIAL COMM BUS	AC ESSENTIAL RADIO BUS	NO. 2 DC RADIO BUS	NO. 2 AC RADIO BUS	VHF NO. 1 (3)
ESSENTIAL	NO. 2							
OFF	OFF	OFF						
OFF	OFF	ON		▨				
OFF	ON	ON		▨		▨	▨	
OFF	ON	OFF				▨	▨	
ON	OFF	ON	▨	▨	▨			▨
ON	OFF	OFF	▨	▨	▨			▨
ON	ON	OFF	▨	▨	▨	▨	▨	▨
ON	ON	ON	▨	▨	▨	▨	▨	▨

▨ INDICATES BUS POWERED

NOTE

(1) ON PILOTS OVERHEAD PANEL
(2) ON FE/SO ELECTRICAL SUBPANEL
(3) INDEPENDENT OF SECONDARY BUS POWER DISTRIBUTION

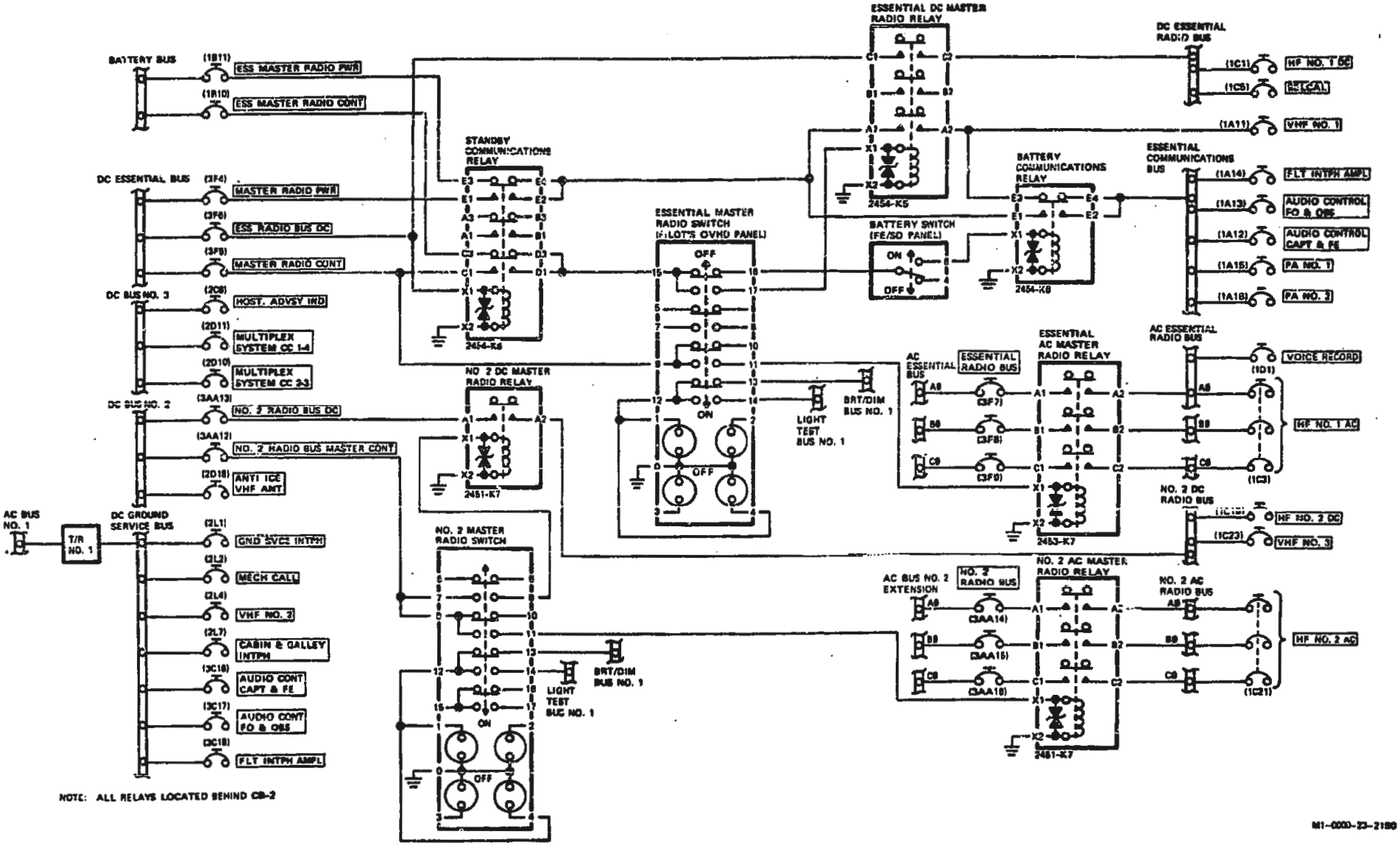
M1-0100-23-2149

R
R

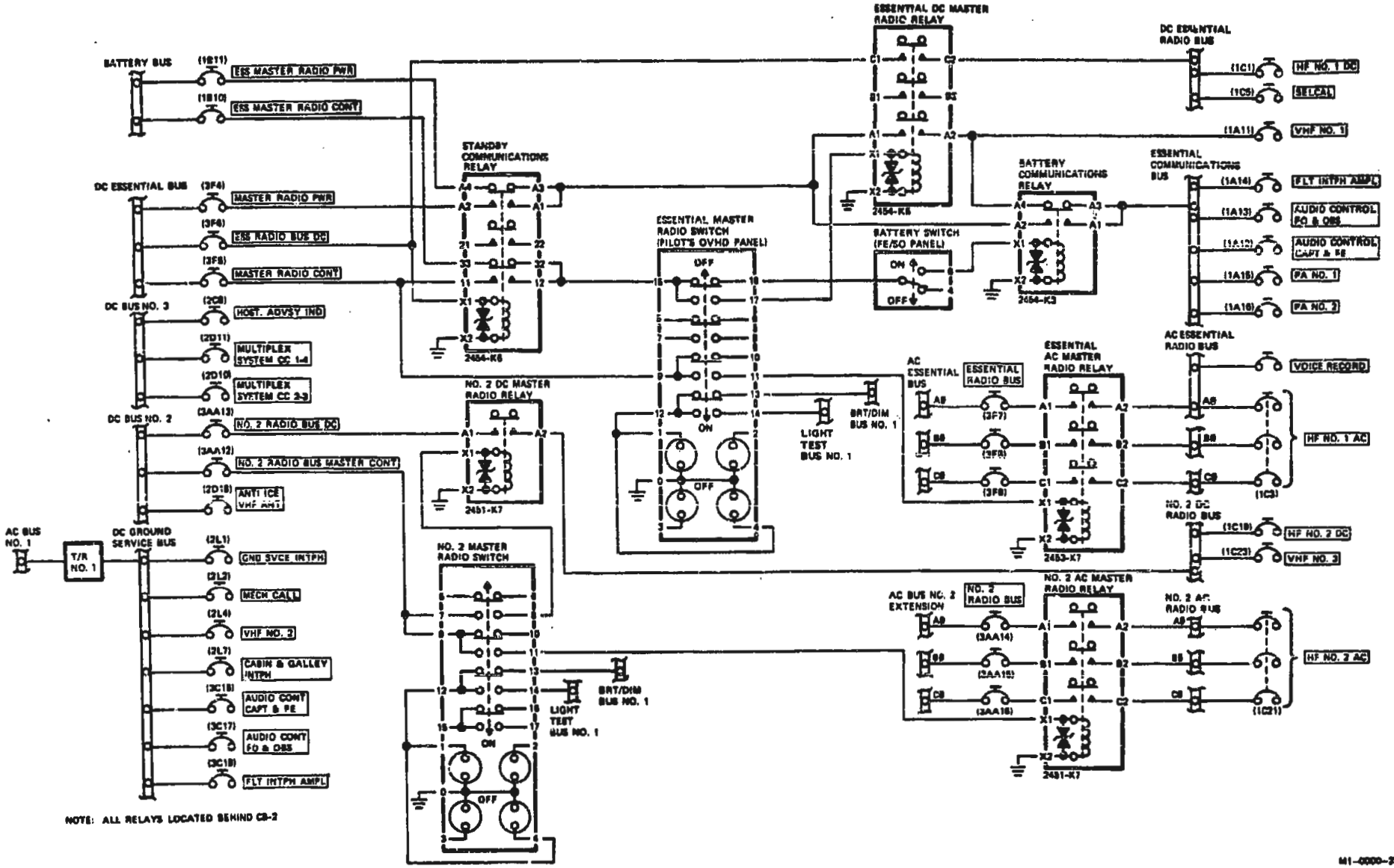
Power Distribution Switch Functions
Figure 3

EFFECTIVITY: ALL

052B



Communications Systems Primary Power Distribution
Figure 4



M1-0000-23-3032

Communications Systems Primary Power Distribution
Figure 4

EFFECTIVITY: 032-999

001B

The PA system enables crewmembers to make announcements over a speaker network throughout the passenger compartment, flight station, and galley. Announcements can be made from PA microphones in the flight station and passenger compartment. PA announcements from the Captains and First Officers oxygen mask microphones can be made through an interface with the audio integrating system. The PA system provides chime signals for cabin interphone calls, passenger service calls, and posted signs. The system also provides amplification and reproduction of music from the boarding music system.

E. Passenger Audio Entertainment and Service System

The passenger audio entertainment and service system provides passengers with individual selection of audio entertainment, and seat arm control for attendant calls, reading lights, and individual air outlets. Built-in test equipment (BITE) is included to isolate faults in the system. The passenger service system is also used to test the passenger oxygen system (Ref. 35-21-00).

F. Passenger Visual Entertainment System

The passenger visual entertainment system provides motion picture entertainment in three areas of the passenger compartment. Each area has a separate movie projector and screen. Sound track audio from each projector is routed to passenger headsets through the passenger audio entertainment and service system.

G. Boarding Music System

The boarding music system provides audio entertainment for the passengers during loading and offloading. Boarding music is supplied by one cassette of the audio entertainment system tape reproducer. Boarding music is amplified and reproduced by the passenger address system.

H. Cabin and Galley Interphone System

The cabin and galley interphone system provides voice communication between the flight station, passenger compartment attendant stations, and the galley. A cabin interphone network connects all areas on one common line, and a galley interphone network connects the galley and three attendant positions on a separate line for galley use. The cabin interphone line can be connected to the flight and service interphones through an interface with the service interphone.

I. Service Interphone System

The service interphone system provides phone jacks in maintenance areas for use during ground maintenance and servicing. The system interfaces with the cabin and galley interphone system and the audio integrating system to provide communication capability throughout the aircraft.

J. Pilot/Mechanic Call System

The pilot/mechanic call system provides a calling signal capability between the flight station and nosewheel well. This signal alerts the flight or ground crew that interphone communication is requested. The flight station signal is a chime tone. The nosewheel well signal is a horn sound.

K. Audio Integrating System

The audio integrating system provides communication capability between flight station crewmember positions, the forward electronics service center, and the nosewheel well (flight interphone). The system also provides interconnections for equipment in the communication system and in the navigation system (Ref. 34-00-00). The integrated functions are:

R Integration of VHF communication audio, navigation
R system audio (VOR, DME, ADF, and marker beacon), and cabin and service interphone audio with the flight interphone system.

Relay switching and impedance matching for interphone and passenger address systems.

R Integration of the voice recorder system with the VHF communication, navigation and interphone systems.

L. Static Discharging System

The static discharging system provides discharge paths for static electricity charges which build up on the aircraft.

M. Voice Recorder System

The voice recorder system provides recording of flight station conversation; and communication, navigation, and interphone audio selected at the Captains, First Officers, and FE/SO audio selector panels.

C CONTROL WHEEL COMMUNICATIONS SWITCH - REMOVAL AND INSTALLATION

C 1. Referenced Procedures

C 20-00-05 Soldering Procedures and Requirements for the L1011 C Aircraft (Wiring Diagram Manual)

C 29-11-00 Hydraulic Power System - Maintenance Practices

C 2. Equipment and Materials

C Adhesive, SM1484-05 (Lear Siegler, Inc.), or equivalent

C Adhesive, RTV732 (Dow Corning), or equivalent

C 3. Removal/Installation

C WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF C (REF. 29-11-00). PLACARD FLIGHT ENGINEER/SECOND C OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, AND C HYDRAULIC SERVICE PANEL, ZONE 147.

C A. Removal

C (1) On flight engineer/second officers hydraulic system C panel, zone 215 and hydraulic service panel, zone 147, C ensure four hydraulic systems are shut off and C placarded. On Master Radio panel, Pilots overhead C panel, verify ESSENTIAL and NO. 2 switchlights are off.

C (2) ON FE/SO lower panel, position BATTERY switch to OFF C and tag.

C (3) Locate communications switch on control wheel, zone 210 C (Ref. Fig. 401).

C (4) Remove setscrew. Tag and note coding and placement of C wires.

C (5) Unsolder wires from switch.

C B. Installation

C (1) Verify that switches opened in Step 3A(1) are OFF and C tagged and four hydraulic systems are shut off and C placarded.

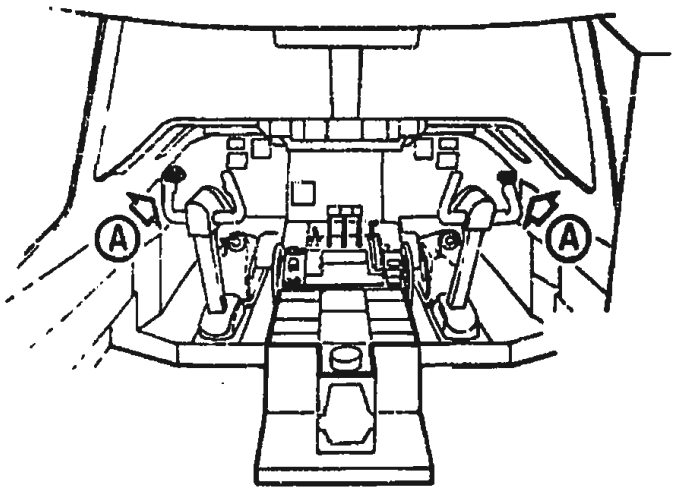
C (2) Solder wires to switch as identified by tags (Ref. C Wiring Diagram Manual 20-00-05).

C (3) Coat SM1484-05 adhesive on setscrew and secure switch.

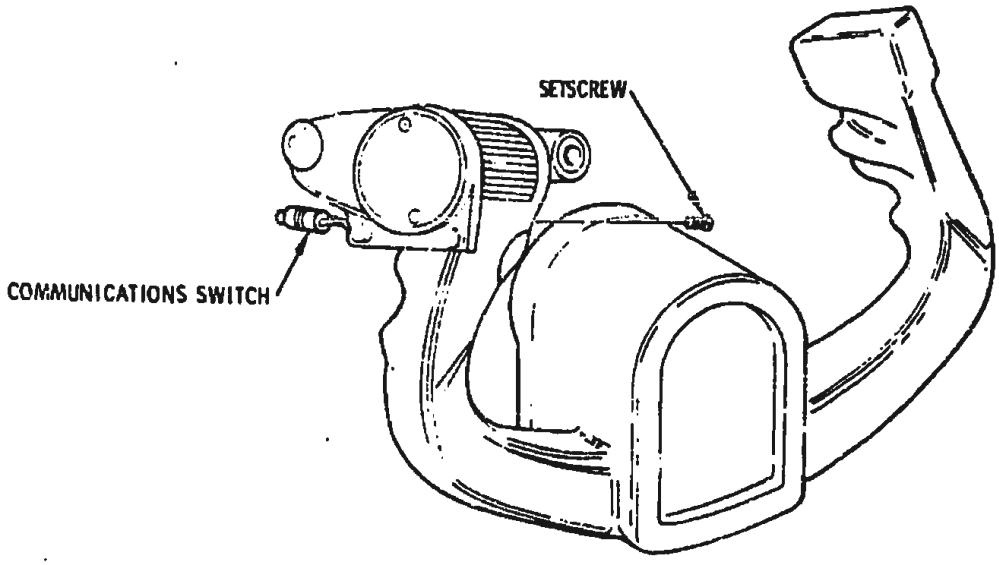
C (4) Use 005-1180-030 adhesive and fill setscrew hole.

C (5) Remove tags from Master Radio panel switches.

C (6) Perform applicable steps of HF operational test (if C installed) reference 23-11-00, and VHF operational C test, reference 23-23-00.



ZONE 210



(A) CAPTAINS CONTROL WHEEL
(FIRST OFFICERS OPPOSITE)

M1-0000-23-1398

C Control Wheel Communications Switch - Removal and Installation
C Figure 401

C COAXIAL CABLE AND ANTENNA TESTING - DESCRIPTION AND OPERATION

C 1. Time Domain Reflectometry - Using Hewlett-Packard HP4920A Cable
C Fault Analyzer

C A. General

C (1) The HP4920A Coaxial Fault Analyzer is used to isolate
C and analyze faults that occur in various types of
C transmission lines. The instrument operates almost
C exactly like a closed-circuit radar system, that is, it
C automatically performs a time/distance correlation
C between an incident and reflected pulse. Because of
C this function, the 4920A can properly be called a Time
C Domain Reflectometer; however, the Coaxial Fault
C Analyzer terminology is better suited to applications
C of this instrument.

C (2) Primarily, the 4920A is used to locate faults in 50-ohm
C coaxial cables that use type "N" connectors and that
C carry signals in the VHF (30 to 300 MHz) range. A
C coaxial cable, whether short or long, is nothing more
C than a basic transmission line and, as such, is
C characterized by transmission-line theory. In
C application, the theory can be quite complex; however,
C to use this instrument, it is only necessary to have a
C surface understanding of a few commonly used terms.
CR These terms are briefly described in the next
C paragraph.

C (3) Coaxial cables have resistance, capacitance, and
C inductance. The degree to which each of these
C parameters is present are cable design functions and,
C as long as the cable is 50-ohms, they do not complicate
C or limit the use of the analyzer. All cables have some
C form of dielectric which is simply the medium that
C separates the inner and outer conductors. The
C separating medium may be air or some synthetic
C substance that is solid, or semi-solid. Whatever the
C cable dielectric happens to be, front-panel controls
C are provided to make the proper selection (see Figure
C 1).

C (4) Any type of fault (resistive, reactive or both)
C introduces a change in the characteristic impedance
C (Z_0) of the cable. The impedance change can be large
C or small and can add to or subtract from Z_0. The
C important thing is that the impedance discontinuity
C will cause a reflection that can be interpreted in
C terms of distance. Distance-versus-time is plotted on

C the horizontal scale of the CRT; a distance
C scale-factor switch located on the front panel provides
C full-scale distance readings of 50, 100, 1000 and 5000
C feet. A marker and expansion capability provides the
C resolution required to examine input/output connectors
C of inline components or other cable hardware with close
C physical spacing.

CR (5) Amplitude-versus-time is plotted on the vertical axis
C of the CRT, typically, the vertical display shows the
C incidence pulse and whatever reflections are present.
C A front-panel control permits the operator to vary
C instrument sensitivity in order to see relatively small
C reflections. In the step mode of operation, impedance
C measurements can readily be made in terms of the
C reflection coefficient (p); the coefficient is easily
C obtained from the vertical display. Also, the fault is
C completely characterized in the step mode, since it
C provides information down to dc. In the impulse mode,
C low-frequency information is attenuated; thus, the
C cable system can be evaluated, even in the presence of
C capacitive coupling or transformer-coupled taps.
C Moreover, the impulse mode is an excellent way to
C evaluate inherent loss characteristics of the cable.

CR B. Performance Data

CR (1) General

CR (a) Input Power:

CR 1) AC-115 or 230V (±10%); 47 to 440 Hz;
CR approximately 66W.

CR 2) DC-11 to 15V; 6.3A at 12V; nominally 76W.

CR (b) Connector: Type "N".

CR (c) Automatic Input Protection: Nominally 5V required
C to open-circuit input; component damage may occur
C if input voltage exceeds 60V.

CR (d) Operating Temp. Range: 0°C to 55°C (32°F to
CR 131°F).

CR (e) Dimensions: 11" high; 8-5/16" wide; 18-1/4" deep.

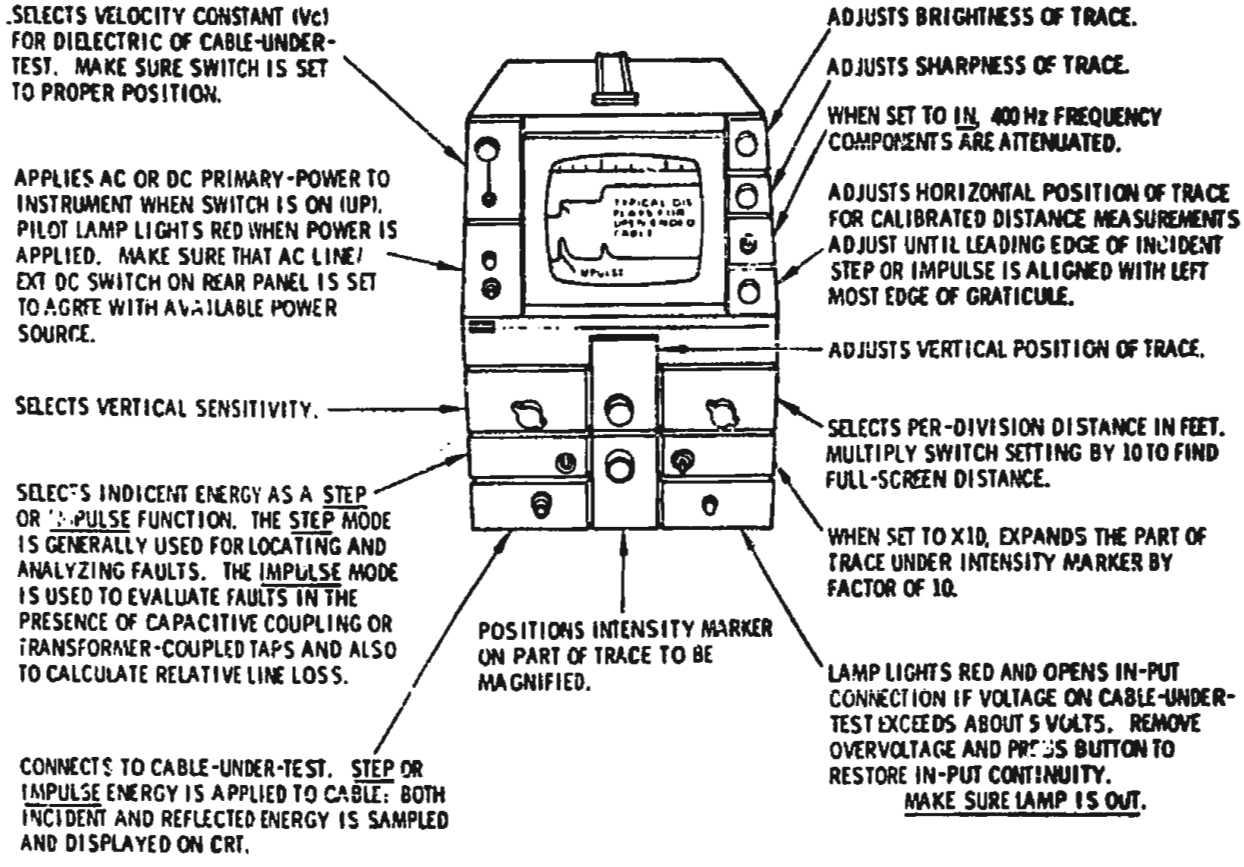
CR (f) Weight: Net 23 lbs; shipping 32 lbs.

CR (g) Accessories Furnished: 10169A Front Cover:
CR 10179A Contrast Filter.

REAR PANEL

TRACE ALIGN - - - - - ALIGNS TRACE WITH HORIZONTAL LINES OF GRATICULE.
LINE PULSE - - - - - - PROTECTS INSTRUMENT AGAINST ELECTRICAL OVERLOAD.
AC LINE/EXT DC - - - SETS UP POWER CIRCUITS FOR AC OR DC OPERATION. (EXT DC POSITION IS DISABLED FOR NON-OPTION INSTRUMENTS THAT ARE FIELD-MODIFIED TO OPERATE FROM 60 Hz/230 VAC.)

CAUTION: INSTRUMENTS ARE WIRED FOR 60 Hz/115 VAC OPERATION.


SELECTS VELOCITY CONSTANT (Vc) FOR DIELECTRIC OF CABLE-UNDER-TEST. MAKE SURE SWITCH IS SET TO PROPER POSITION.
APPLIES AC OR DC PRIMARY-POWER TO INSTRUMENT WHEN SWITCH IS ON (UP). PILOT LAMP LIGHTS RED WHEN POWER IS APPLIED. MAKE SURE THAT AC LINE/EXT DC SWITCH ON REAR PANEL IS SET TO AGREE WITH AVAILABLE POWER SOURCE.
SELECTS VERTICAL SENSITIVITY.
SELECTS INDICENT ENERGY AS A STEP OR IMPULSE FUNCTION. THE STEP MODE IS GENERALLY USED FOR LOCATING AND ANALYZING FAULTS. THE IMPULSE MODE IS USED TO EVALUATE FAULTS IN THE PRESENCE OF CAPACITIVE COUPLING OR TRANSFORMER-COUPLED TAPS AND ALSO TO CALCULATE RELATIVE LINE LOSS.
CONNECTS TO CABLE-UNDER-TEST. STEP OR IMPULSE ENERGY IS APPLIED TO CABLE: BOTH INCIDENT AND REFLECTED ENERGY IS SAMPLED AND DISPLAYED ON CRT.
ADJUSTS BRIGHTNESS OF TRACE.
ADJUSTS SHARPNESS OF TRACE.
WHEN SET TO IN, 400 Hz FREQUENCY COMPONENTS ARE ATTENUATED.
ADJUSTS HORIZONTAL POSITION OF TRACE FOR CALIBRATED DISTANCE MEASUREMENTS ADJUST UNTIL LEADING EDGE OF INCIDENT STEP OR IMPULSE IS ALIGNED WITH LEFT MOST EDGE OF GRATICULE.
ADJUSTS VERTICAL POSITION OF TRACE.
SELECTS PER-DIVISION DISTANCE IN FEET. MULTIPLY SWITCH SETTING BY 10 TO FIND FULL-SCREEN DISTANCE.
WHEN SET TO X10, EXPANDS THE PART OF TRACE UNDER INTENSITY MARKER BY FACTOR OF 10.
POSITIONS INTENSITY MARKER ON PART OF TRACE TO BE MAGNIFIED.
LAMP LIGHTS RED AND OPENS IN-PUT CONNECTION IF VOLTAGE ON CABLE-UNDER-TEST EXCEEDS ABOUT 5 VOLTS. REMOVE OVERVOLTAGE AND PRESS BUTTON TO RESTORE IN-PUT CONTINUITY. MAKE SURE LAMP IS OUT.

MI-0001-23-1329

CR Coaxial Fault Analyzer 4920A - Controls and Indicators
CR Figure 1

CR (2) Vertical (% Reflection) Scale

CR (a) Calibrated to indicate percentage of incident
C pulse reflected back to input. Four sensitivity
C ranges: 50% DIV; 25% DIV; 5% DIV; and 2.5% DIV.

CR (b) Faults that reflect as little as 0.5% of the input
C incident energy can be resolved over the effective
C VHF bandwidth.

CR (3) Horizontal (Distance) Scale

CR (a) Calibrated to indicate distance-to-fault in feet.
C Five distance ranges: 5 FT/DIV; 10 FT/DIV; 50
C FT/DIV; 100 FT/DIV; and 500 FT/DIV. Maximum range
C 5000 feet. Distances can be resolved to within 2%
C of full-screen with an accuracy better than ±5%.

CR (b) Fixed calibration for velocity constant (Vc) of
C SOLID (Vc = .66) and FOAM (Vc = .81) dielectrics;
C variable calibration for any dielectric Vc between
C .6 and 1.0. Any one-tenth part of basic trace can
C be expanded by a factor of 10.

CR (4) Display

CR (a) Cathode-Ray Tube with P31 phosphor-natural
C persistence of approximately 0.1 second.

CR (b) For convenient reading, the eight major vertical
C divisions and the ten major horizontal divisions
C are each divided into five subdivisions. To
C prevent parallax errors, graticule is permanently
C etched into CRT screen.

CR C. Glossary

CR (1) Bandwidth

CR (a) The frequency range over which an acceptable TDR
C measurement can be made. For the 4920A, the low
C limit is dc and the high limit is somewhat greater
C than 300 MHz.

CR (2) Characteristic Impedance (Z_0)

CR (a) The property of any transmission line that
C determines, for a given applied voltage, how much
C current can flow if the line is infinitely long.
C The characteristic impedance is purely resistive
C and any line terminated in Z_0 appears infinitely

C long, that is, no incident energy will be
C reflected.

CR (3) Comparator

CR (a) A circuit that compares two identical quantities
C such as frequency-versus-frequency,
C amplitude-versus-amplitude, etc. When the two
C quantities are equal, the comparator output
C generally provides some sort of circuit-control
C function.

CR (4) Dielectric

CR (a) Medium that separates inner & outer conductors in
CR coaxial cables.

CR (5) Fault

CR (a) Cable faults are directly related to the
C characteristic impedance of the line. Since Z_0
C varies according to conductor size, conductor
C spacing, and the dielectric, changes in any one of
C these parameters will alter Z_0 and produce a fault
C of some magnitude. Insulation damage, water
C seepage, kinks, and many other things will change
C Z_0 and cause detectable faults. (An open-ended or
C shorted cable without fault will still show some
C loss in the reflected energy; this is simply a
C result of copper and hysteresis loss.)

CR (6) Impulse

CR (a) A rectangular pulse after differentiation.

CR (7) Incident Pulse

CR (a) Source energy as opposed to reflected energy.

CR (8) Reflected Pulse

CR (a) Reflected energy as opposed to that originating at
CR the source.

CR (9) Reflection Coef.

CR (a) The ratio of reflected energy to incident energy
CR normalized to Z_0.

CR (10) Risetime

CR (a) The time a step-or-impulse voltage function takes
C to reach 80% of full amplitude.

CR (11) Sampling

CR (a) The technique whereby amplitude measurements are
C made on a point-by-point basis; final waveform is
C a plot of all the points.

CR (12) Step

CR (a) A rectangular pulse.

CR (13) Time Domain Reflectometry

CR (a) Commonly abbreviated TDR - the technique whereby a
C voltage step is sent down a transmission line and
C then the initial voltage as well as all
C reflections are monitored.

CR (14) Velocity Constant

CR (a) For a given dielectric, the speed at which
C electromagnetic energy travels down the line
C relative to the speed of travel in an air
C deilectric.

CR NOTE: These definitions are to help the operator
C use the Coaxial Fault Analyzer; they are
C not meant to be mathematical models of
C accuracy.

CR D. Operation

CR (1) Before using the instrument, allow a 60-second warmup.

CR CAUTION: MEDIUM LENGTH AND LONG-RUN CABLES ACCUMULATE
C A HIGH CHARGE MERELY BECAUSE OF THEIR
C INHERENT CAPACITANCE. TO AVOID COMPONENT
C DAMAGE ALWAYS DISCHARGE CABLE BEFORE
C CONNECTING TO INSTRUMENT.

CR (2) Remove all voltages from cable or system-under-test.

CR (3) If the cable-under-test is long, lossy and has multiple
C faults, the incident pulse may be attenuated to the
C point where there is little or no reflected energy.
C For this condition the faults should be repaired in
C sequence and the cable should be re-examined after each
C repair. There is no possibility of missing a fault if
C this procedure is followed.

CR (4) Do not attempt to measure cables longer than 5000 feet.

CR E. Setup Procedures: (See Figure 2)

CR F. Installation/Removal of Contrast Filter

CR (1) To install filter, grasp top-and-bottom of
C graticule-protection hood; sqeeze-and-release to
C separate hood from window-housing assembly. Lay
C contrast filter against face of CRT.

CR (2) Snap hood into place; press each corner of hood to
CR ensure a no-gap fit.

CR (3) To take out the filter - a necessity if taking
C photographs- remove the hood and tap one edge of filter
C until it drops away from the etched graticule.

CR (4) The filter is exposed to the elements; thus, it should
C be periodically removed and cleaned. Any non-abrasive
C cleaner will suffice.

CR G. Interpreting Reflected Pulses

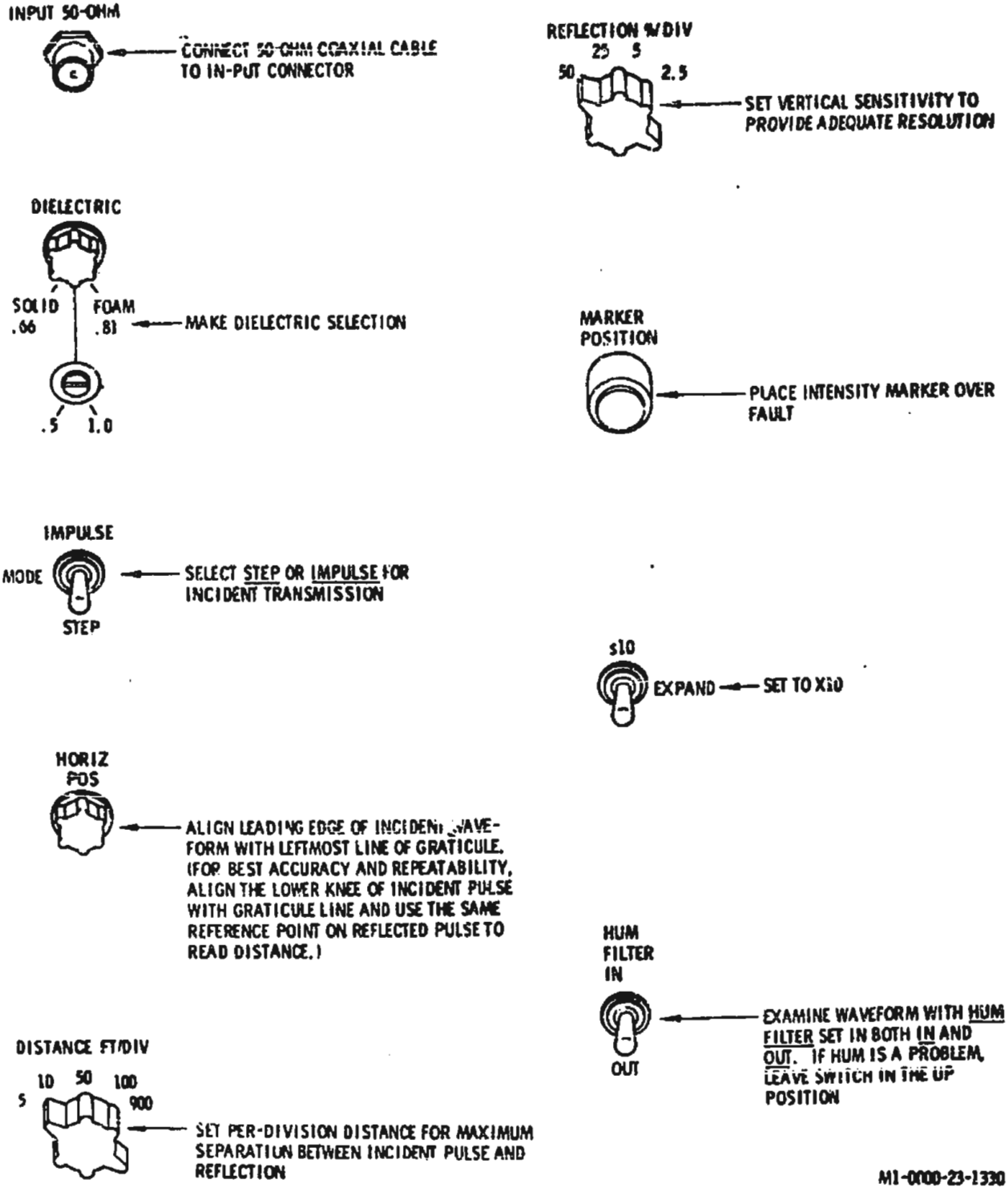
CR (1) Typical reflections are shown in the Adjustment/Test
C procedure (Figures 501 thru 508). Noise on the scope
C trace may sometimes be reduced or eliminated by use of
C the analyzer hum filter.

CR (2) Generally, with a transmission line connected to its
C antenna, a complex impedance trace will be observed at
C the antenna and, often, enough impulse noise or RF
C signals will be picked up to produce a blur instead of
C a trace.

CR (3) If 60Hz or 400Hz hum pick-up should present itself such
C than an unsatisfactory check of cable/connector
C condition cannot be checked when using the 5 or 2.5%
C switch positions (usually on long cable runs) even with
C the hum filter switched in--

CR (a) Try using a standard three-prong (grounded) to
C two-prong AC power cord adapter leaving the
C grounding pigtail ungrounded. Try both 60Hz
C commercial power or ships 400Hz power. If these
C measures do not eliminate the ripple on the scope
C trace the procedure outlined in the next step must
C be used.

CR (b) Leave the far end of the cable under test
C open-circuited and check its performance on the
C 2.5% position. If the cable meets specifications,



Set Up Procedure
Figure 2

C repeat the test with the cable analyses connected
C to the opposite end. If the cable and connectors
C still meet specifications, the test is considered
C satisfactory.

C NOTE: Usually ripple on the scope trace for long
C cable runs will occur only when the far end
C is shorted or terminated with the 50 ohm
C load and the open-circuited cable trace
C will be free of ripple.

C H. Check Triaxial Cable:

C The ADF sense antenna cables on some aircraft require
C special adapters and terminators. The "shorting"
C terminator places a short between center conductor and
C outer shield. The "75ohm" terminator places a 75 ohm
C resistor between the center conductor and inner shield.
C Both terminators must be used to check for open
C shields.

C 2. Frequency Domain Reflectometry - Using Wiltron 640 RF Analyzer

C A. General

C (1) By use of swept - frequency techniques, the voltage
C standing wave ratio (VSWR) of any 50 ohm antenna system
C may be determined for the actual frequency band for
C which the system is designed. Likewise, coaxial
C transmission line attenuation (line loss) over the same
C frequency band may be checked.

C (2) Antenna system VSWR specifications (Ref. Figure 3) and
C transmission line attenuation specifications (Ref.
C Figure 4) are shown in tabulated form. Should an
C antenna system VSWR not meet the VSWR requirements,
C transmission line-attenuation measurements may be
C performed to eliminate this component as a source of
C malfunction or antenna components changed and
C rechecked.

C (3) Transmission-line attenuation can be caused by such
CR factors as center-conductor migration, pinched, dented
C or cut cable, open center conductor, open shield,
C moisture, sharp bends or kinks and defective or poorly
C installed coaxial connectors. Verification and
C location of some of these faults can be made using the
C Hewlett-Packard HP 4920A Cable Fault Analyzer.
C However, if the cable attenuation is due to frequency -
C sensitive irregularities or an accumulation of
C irregularities too small to be significant, as seen by

CR the HP 4920A analyzer, the Wiltron check may dictate
CR replacement of the transmission line to improve over
CR all antenna system performance. The Wiltron can also
CR be used to determine the approximate distance to a
CR transmission line fault but the techniques are more
CR elaborate than those of the Hewlett-Packard analyzer.

CR (4) Description and operation of the Wiltron tester, plus
CR measurement procedures, are contained in the manual
CR accompanying each tester kit, R&R 90228 (also published
CR in the Illustrated Tool and Equipment Manual, Chapter
CR 34). The tester is capable of sweeping from 1 to 1500
CR MHz.

CR (5) Transmission line attenuation measurements may be made
CR on non-antenna systems such as weather radar video
CR coax, passenger entertainment video or multiplex system
CR coax, etc. as long as the coax has an impedance of 50
CR ohms. Weather radar video coax, passenger
CR entertainment video and multiplex systems should be
CR swept from 1 to 5 MHz. Refer to the Wiring Diagram
CR Manual and Chapter 23-03-00 of the Maintenance Manual
CR for coaxial cable type and its impedance.

CR B. Antenna System VSWR Specifications

SYSTEM	VSWR	FREQUENCY MHZ	NOTES
HF	< 2:1	2-18	TUNED
VHF	< 2:1	118-136	
VOR	< 3:1	108-118	PREAMP TO ANTENNA
LOCALIZER	< 5:1	108-112	
GLIDE SLOPE	< 2:1	329-335	
MARKER	< 1.5:1	75	
MARKER	< 5.1:1	75±150 KHZ	
ATC	< 1.7:1	950-1215	
ATC	< 1.42:1	1000-1100	
DME	< 1.7:1	950-1215	
DME	< 1.42:1	1000-1215	

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CR Antenna System VSWR Specifications
CR Figure 3

CR C. Transmission Line Attenuation

CR NOTE: Due to varying configurations and coaxial cable types
CR within a fleet, use of the table will require
CR reference to the Wiring Diagram Manual for cable
CR types (and, in some instances, the length) or to the
CR hook-up charts for cable lengths. Coaxial cable
CR connectors that are not damaged nor improperly
CR assembled have negligible insertion loss and may be
CR disregarded.

CABLE TYPE	ATTENUATION PER 100 FT. (db)					
	10 MHz	50MHz	100MHz	200MHz	500MHz	1000MHz
RG58C/U	1.40	3.30	4.90	7.30	11.00	20.00
RG115A/U	.60	1.40	2.10	3.10	4.50	7.50
RG214/U	.66	1.50	2.20	3.20	4.60	9.00
250-4170	1.35	3.80	6.20	10.42	18.03	38.85
250-4171	.729	2.40	4.23	7.63	14.08	60.0
250-4172	.729	2.40	4.23	7.63	14.08	60.0

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CR Transmission Line Attenuation Specifications
CR Figure 4

R EFFECTIVITY: ALL
R
001B

CR COAXIAL CABLE AND ANTENNA TESTING - ADJUSTMENT/TEST

CR 1. Coaxial Cable - Test

CR A. Equipment Required

CR (1) R & R 90189 kit -- consisting of one HP4920A analyzer, one 20-foot 52 ohm extender cable, an assortment of between-series coaxial cable connector adapters, one short-circuited terminator and terminators of various impedances. Also included are L-pads for matching 50 ohms to 73, 93 and 200 ohms.

CR B. Testing Procedures - Coaxial Cables

CR (1) Connect the analyzer to a source of 115 volt, 60 or 400 cycle power.

CR NOTE: Use of the third (grounding) blade on the power cord should be determined by experience. It preferably should be used to provide a ground for the analyzer but may cause excessive noise on the scope trace in some instances.

CR (2) Connect the 20 foot extender cable to the analyzer and turn on the power to the analyzer.

CR (3) After a 60 second warm-up, position the controls as follows and check that the open-ended trace falls on the second graticule line from the left.

CR (a) Dielectric--solid .66

CR (b) Mode--step

CR (c) Horizontal position--as required (see description-figure 1)

CR (d) Distance FT/Div--10

CR (e) Reflection %/Div--50

CR (f) Marker--(disregard)

CR (g) Expand--off

CR (h) Hum filter--out

CR (i) Intensity--as required

(j) Focus--as required

(k) Vertical position--as required to position the trace upon the center horizontal graticule line.

(4) If the open-ended trace does not coincide with the second vertical line, adjust the dielectric screwdriver adjustment as required.

(5) Disconnect the far end of the coaxial cable to be tested.

(6) Using the proper between-series adapter, connect the extender cable to the cable under test. (See Figures 501 thru 506).

(7) Set the distance Ft/Div switch to the position required to view the open-ended reflected pulse. Note the position in feet.

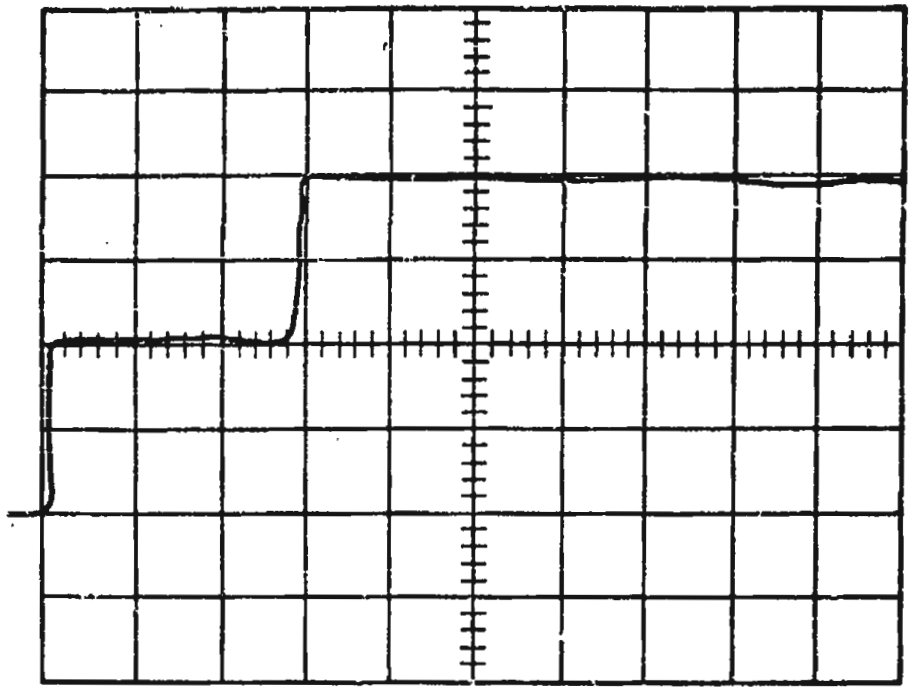
(8) Place a short circuited terminator on the far end of the cable. The short-circuited reflected pulse should coincide with the distance observed in step (7). If no short-circuited pulse is observed, the cable is open at the point shown in step (7). Conversely, if a short-circuited pulse is observed in step (7) the cable is shorted.

(9) If the indications in steps (7) and (8) are normal, observe the step heighth and slope as shown in Figure 507 and 508 to determine cable losses. Figures 507 and 508 indicate extreme cases of lossy lines. Normally very little step or slope should be observed on a good cable.

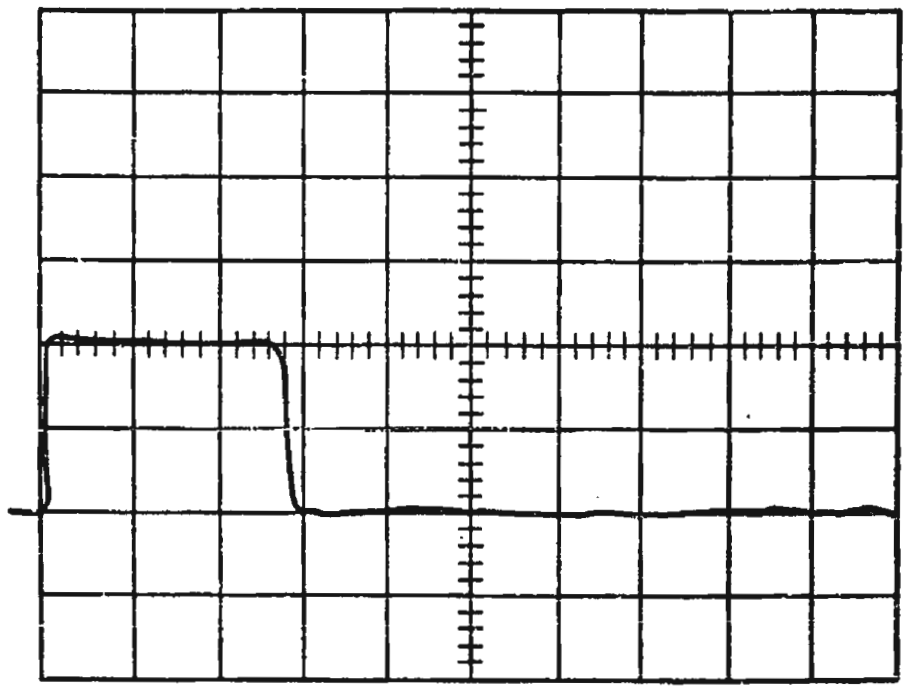
(10) Remove the short-circuited terminator and connect a terminator of the proper impedance to the cable. Place the Reflection %/Div switch to 5. (The Vertical Position control may need to be adjusted to re-center the trace on the centerline). Refer to Figure 509 to convert reflections to impedance (Z) or V.S.W.R.

(11) Determine if the cable and connectors meet the tolerances outlined below. If not make corrections, as required, and re-check. (Refer to Fig. 509 to convert reflections to impedance).

(a) Impedance variations for low range radio altimeter cable runs are not to exceed 50 ±1 ohms. Maximum impedance variations for L.R.R.A. system coaxial connectors are as follows:



TRANSMISSION LINE OPEN AT FAR END
FIGURE 501



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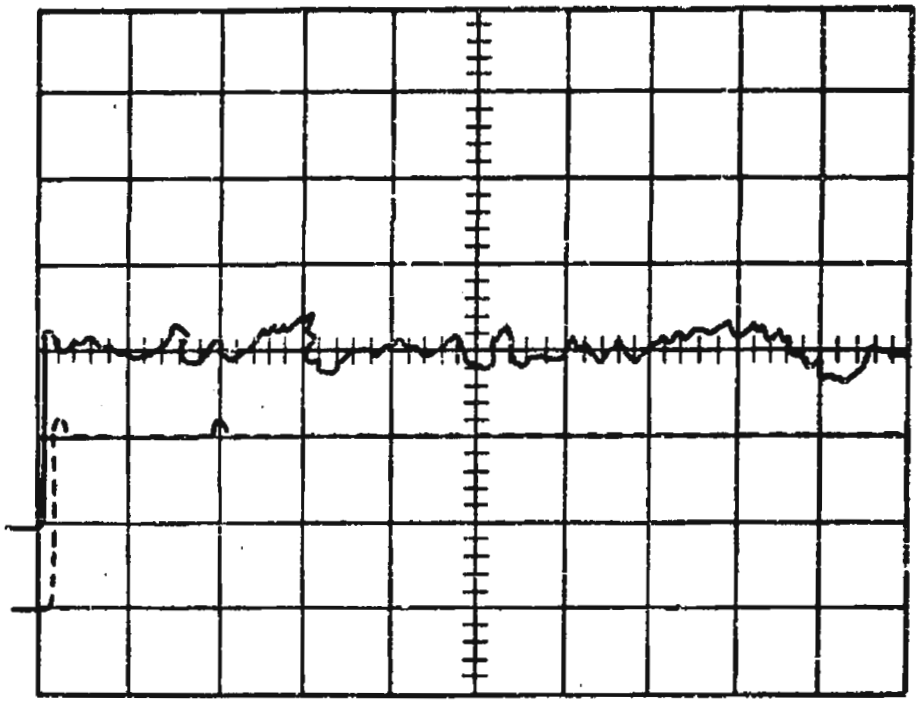
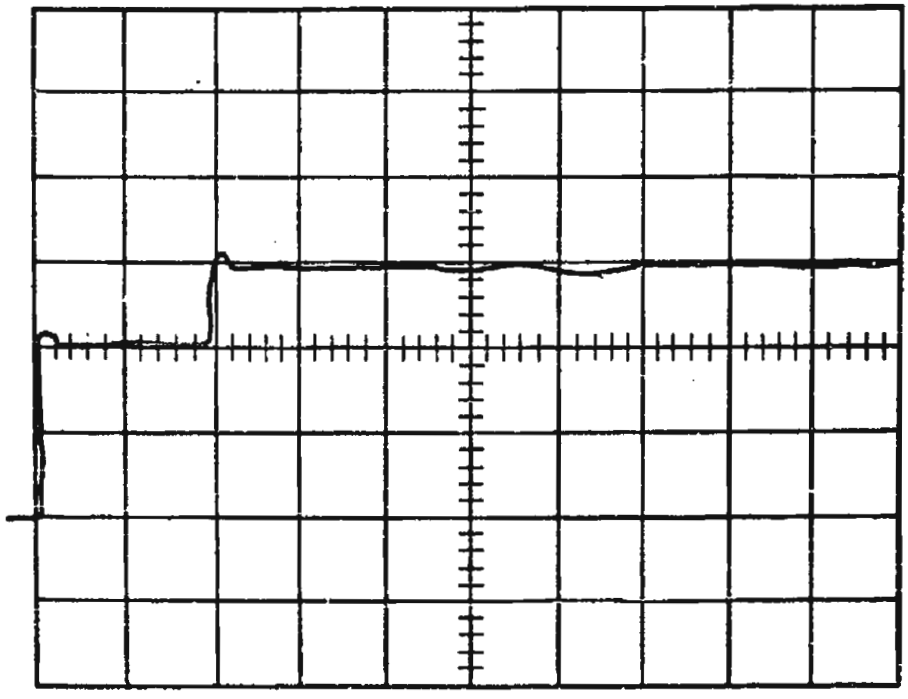
CR

Transmission Line Shorted at Far End
Figure 502



DOTTED-LINE -- THEORETICAL TRANSMISSION,
SOLID-LINE — CLOSE TO ACTUAL TRANSMISSION LINE.
FIGURE 503



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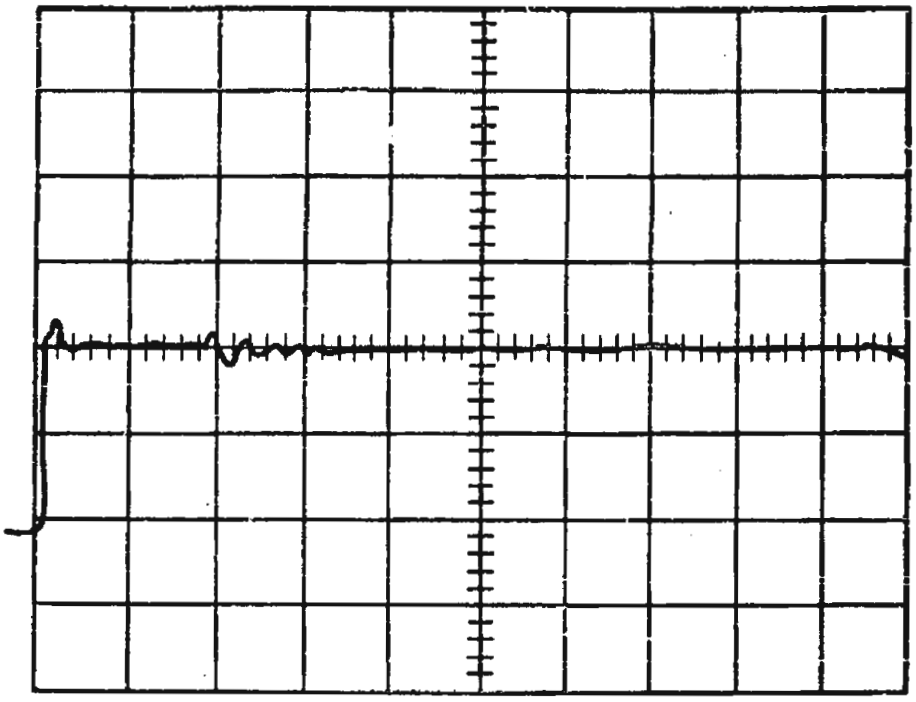
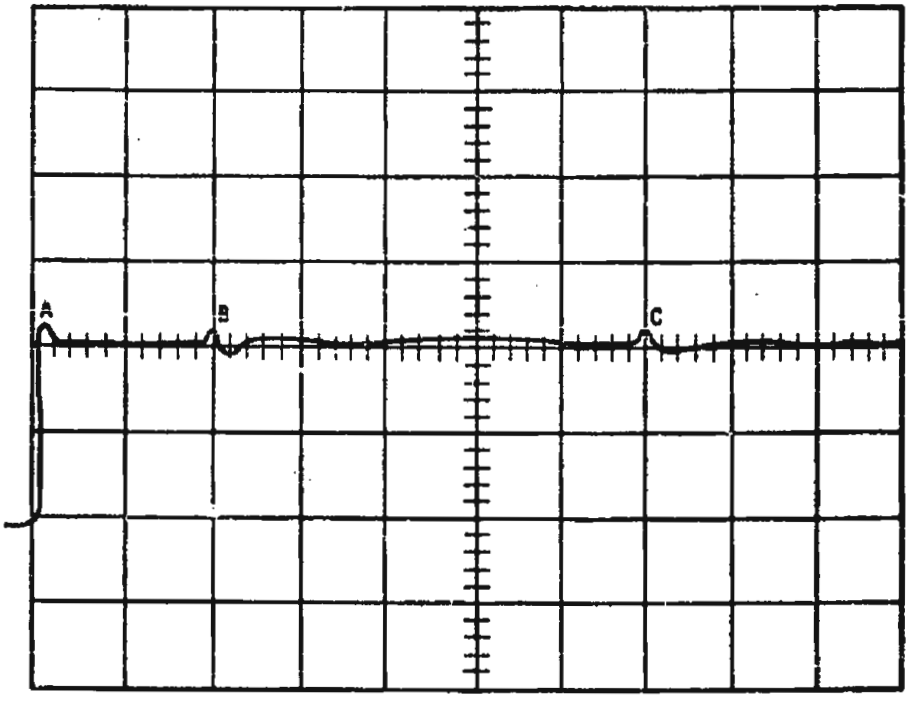
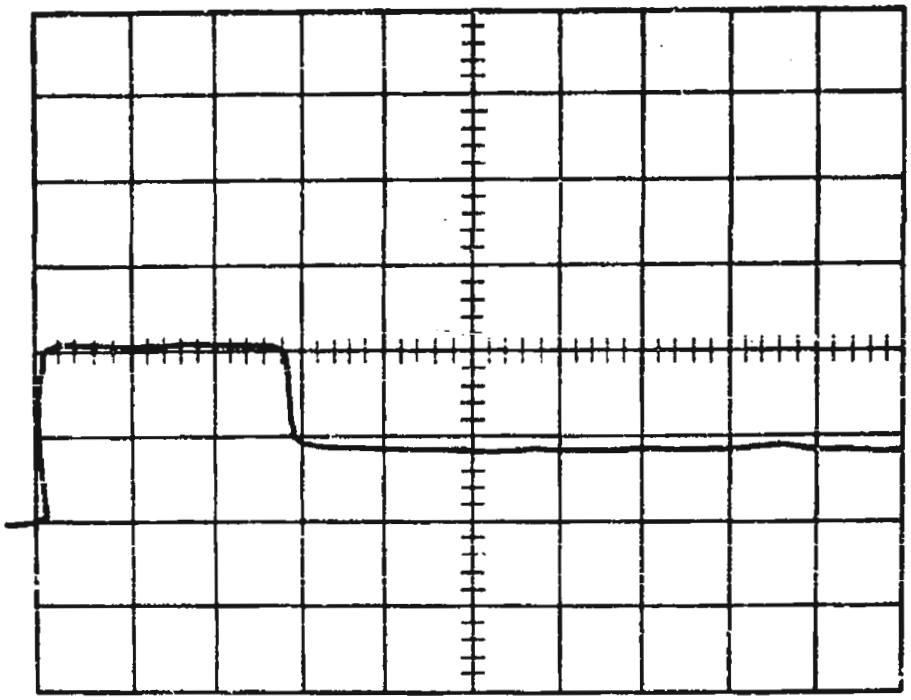
CR 20 Ft. Extender Cable Connected to a Cable of
CR Higher Impedance Than 52 Ohms
CR Figure 504



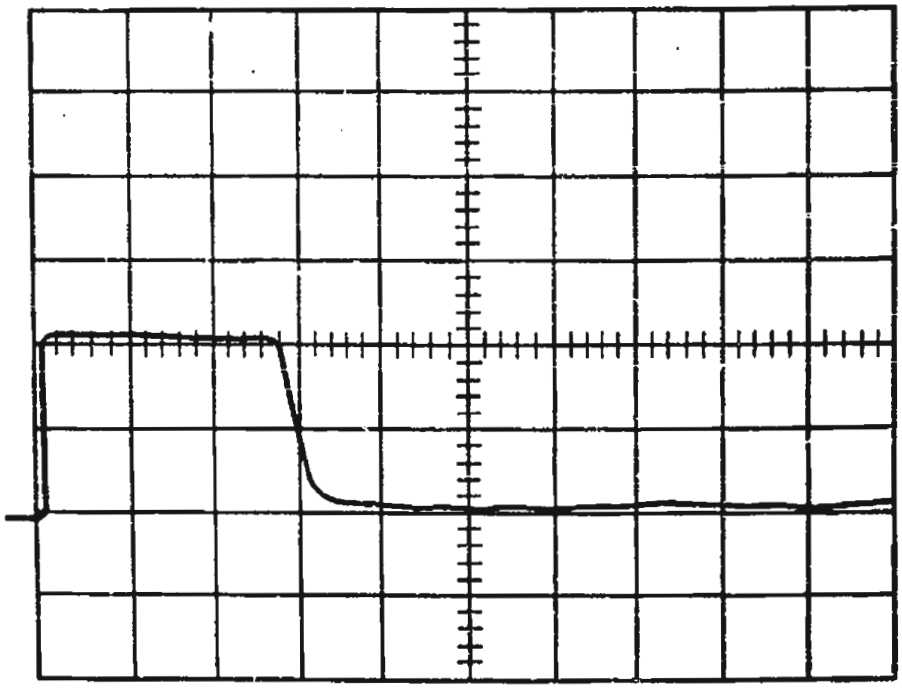
"RINGING", INDICATING POOR MATING AT END OF 20 FT. EXTENDER CABLE
FIGURE 505



CR Pulse A - Connector at Analyzer; M1-0001-29-1330
CR Pulse B - Connector at Far End of 20 Ft. Extender Cable;
CR Pulse C - Connector at 50 Ohm Load Connected to
CR End of a 50 Ft. Ohm Cable
CR Figure 506



SHORTENED REFLECTED PULSE INDICATES DC AND LOW-FREQUENCY LOSSES
(LOSSY-LINE)
FIGURE 507



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CR Large Fall-Time of Reflected Pulse Indicates High-Frequency Losses
CR (Lossy-Line)
CR Figure 508

1) DPX rack connector--4.5 ohms

2) Right angle TNC--5.5 ohms

3) Type C (crimp)--4.0 ohms

4) Type N (crimp)--3.0 ohms

(b) Maximum impedance variation for coaxial cables other than L.R.R.A. cables is as follows:

50 ± 2 OHMS	75 ± 3 OHMS
52 ± 2 OHMS	93 ± 5 OHMS
53.5 ± 2 OHMS	95 ± 5 OHMS
73 ± 3 OHMS	185 ± 10 OHMS

NOTE: 50 OHM connectors are used on almost all cables regardless of cable impedance and the mismatch tolerated.

(c) Maximum impedance variation for coaxial connectors other than L.R.R.A. connectors is 10 ohms.

(12) Turn off the analyzer and stow the equipment.

NOTE: During the tests the cable should be flexed slightly at the entry to any connector to detect intermittent connections.

Characteristics of Coaxial/Triaxial Cable Used on TWA Aircraft

Cable Type Nbr.:	Nominal Characteristic Impedance:	Nominal Velocity Factor:
RG8( )	52 OHMS	.66
RG58	53.5 OHMS	.66
RG58A	52 OHMS	.66
RG58B	52 OHMS	.66
RG58C	50 OHMS	.66
RG59	73 OHMS	.66
RG59B	75 OHMS	.66
RG62( )	93 OHMS	.84 - .88
RG71( )	93 OHMS	.84 - .88
RG114( )	185 OHMS	.84 - .88
RG115( )	50 OHMS	.69
RG142( )	50 OHMS	.69
RG213	50 OHMS	.66
RG214	50 OHMS	.66

C Characteristics of Coaxial/Triaxial Cable Used on TWA Aircraft
C (Cont)

Cable Type Nbr.:	Nominal Characteristic Impedance:	Nominal Velocity Factor:
RG223	50 OHMS	.66
RG225	50 OHMS	.69
RG231	50 OHMS	.80
BA5903	50 OHMS	.80
BA6416A(Triax)	75 OHMS	.80
BA6903	50 OHMS	.80
BA13077A	50 OHMS	.70
BA14349	50 OHMS	.70
MI5406	50 OHMS	.69
250-4170	50 OHMS	.80
250-4171	50 OHMS	.80
250-4172	50 OHMS	.80
5012F1339(10-008)	50 OHMS	.67
5021E1331(09-058A)	50 OHMS	.66
7524D5011(10-363)(Triax)	75 OHMS	.80
7526D1312(09-026)	75 OHMS	.71

2. Antenna-Test

A. Test Procedures - Antennas

(1) When developed and published, the "signature" of a normal antenna will be shown. Signatures other than normal "signatures" indicate a defective antenna. Refer to the particular antenna Maintenance Practices section.

SCALE FOR CONVERTING REFLECTION COEFFICIENT TO V. S. W. R.

EXAMPLE - WITH REFLECTION Z/DIV. SET TO 5 (0.05) AND A DEVIATION OF 4 CM FROM THE 50 OHM BASE LINE, THE V. S. W. R. WOULD BE 1.5 TO 1.0, ETC.

IN ALL INSTANCES, THE 20 FT. EXTENDER CABLE SHOULD BE ALIGNED WITH THE 50 OHM BASE-LINE AS A STANDARD.

V. S. W. R. AND IMPEDANCE OF AIRCRAFT COAX TRANSMISSION LINES AND THEIR TERMINATION IN AN ANTENNA MAY BE DETERMINED WITH REASONABLE ACCURACY.

SCALE FOR CONVERTING REFLECTION COEFFICIENT TO IMPEDANCE, NORMALIZED TO 50 OHMS Zo. FOR SCALES NORMALIZED FOR OTHER IMPEDANCES - SEE FIG. 510.
EXAMPLE - WITH REFLECTION Z/DIV SET TO 5 (0.05) AND REFLECTED PULSE EQUAL TO 2 CM BELOW THE 50 OHM BASE LINE - THE IMPEDANCE AT THAT DISCONTINUITY WOULD BE 41 OHMS

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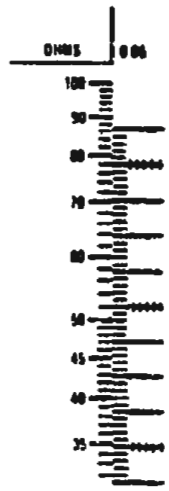
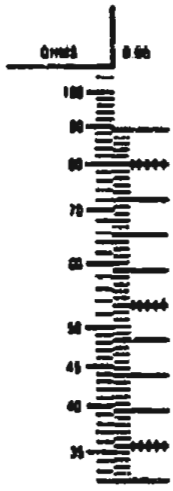
CR
CR

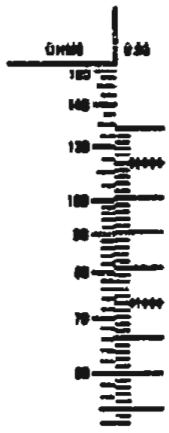
Scale - Converting Reflection Coefficient to V.S.W.R.
Figure 509



52 OHM

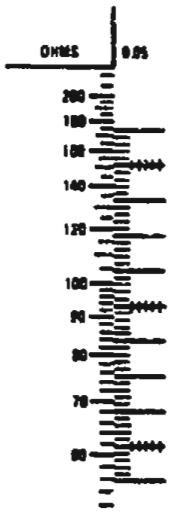


53.5 OHM

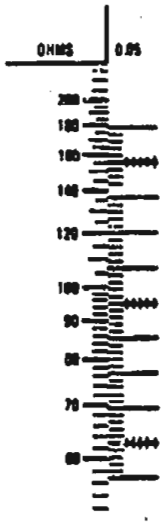


73 OHM

75 OHM



93 OHM



95 OHM

185 OHM

MI-0000-23-1342

CR
CR

Impedance Conversion Scales
Figure 510

EFFECTIVITY: ALL

001B

CR COAXIAL CABLE - INSPECTION/CHECK

CR NOTE: Procedure using the Fault Finder - Model FF60AB/722

CR 1. Inspection/Check Coaxial Cable

CR A. If intermittent malfunctioning or excessive noise problems CR are experienced in an electronic system, all system coaxial CR connections should be inspected and checked. Oxidation may CR occur at soldered connections between connectors and coaxial CR cables and with time, may progress until system malfunction CR occurs.

CR B. Equipment and Materials

CR (1) Fault Finder Model FF60AB/722 - Radar Engineers, 4719 CR Brooklyn - Seattle, Washington. --R & R 90115.

CR (2) 115V AC 10 60 cycle power source - continuous duty115V CR AC 10 400 cycle power source if in use for less than 1 CR hour.

CR C. Prepare to Check Coaxial Cable

CR (1) If cable to be checked is terminated in an antenna, CR disconnect from antenna.

CR (2) Turn Fault Finder on and let it warm up for one minute. CR (See Figure 601.)

CR (3) Remove any sweep retrace with INTENSITY control.

CR (4) Adjust FOCUS for sharp trace.

CR (5) Adjust LEFT-RIGHT control until base of leading edge of CR transmitted pulse is on zero crosshair on graticule.

CR (6) Adjust UP-DOWN control until base of pulse is behind CR horizontal line on graticule.

CR (7) Push 50 ft. MARKS switch and adjust WIDTH control on CR back of case to make marks coincide with proper CR crosshairs. Return switch to center position.

CR (8) Connect a 25 or 50 foot length of polyethylene coaxial CR cable to the Fault Finder. Connect cable to be checked CR to other end of jumper cable.

CR NOTE: The 25 or 50 foot length of jumper cable may be CR eliminated but accuracy of the instrument is

CR then good only beyond the first ten feet of
CR checked cable. Faults in the first ten feet of
CR the cable may not be apparent.

CR D. Check Coaxial Cable

CR (1) Note deflection of the pulse trace across the
CR graticule. (See Figure 601.)

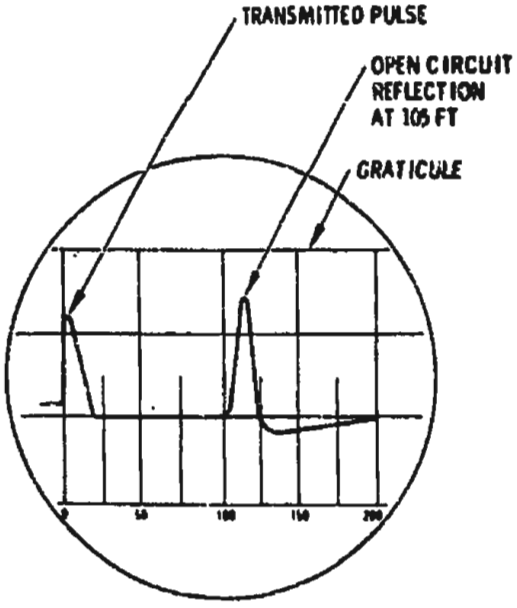
CR NOTE: Multiple reflections will be obtained from
CR cables less then 100 feet long. Measure between
CR leading edges of transmitted and reflected
CR signals at points where they leave the base
CR line. Normal output impednace is 680 ohms.
CR With the 72 OHM TERMINATION switch ON, the
CR impedance is reduced to 72 ohms thus minimizing
CR multiple reflections on short cables.

CR (a) An open type fault or mismatch into a higher
CR impedance will be indicated by an upward
CR deflection. (See detail A.)

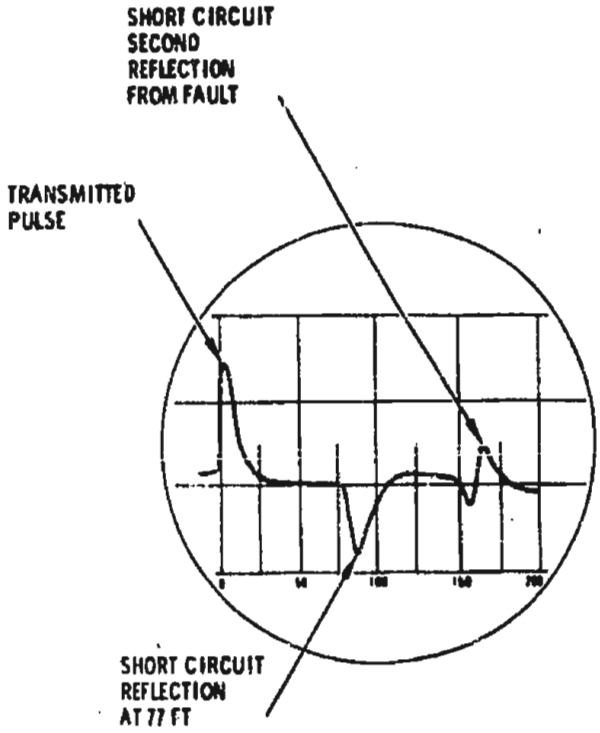
CR (b) A short circuit or mismatch into a lower impedance
CR will be indicated by a downward deflection. (See
CR detail B.)

CR (c) Intermittent connections will be readily indicated
CR by a flickering of the signal trace as the
CR connection is made and broken.

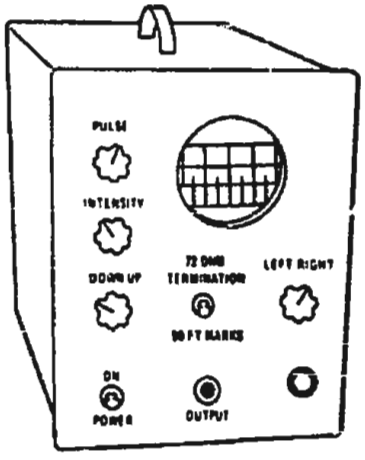
CR (d) Position of the leading edge of the fault trace on
CR the graticule will indicate distance to fault.
CR The length of any jumper cables must be
CR subtracted.



DETAIL A



DETAIL B



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CR
CR

Cable Fault Finder
Figure 601

R
R
001B

EFFECTIVITY: ALL

C HF COMMUNICATION SYSTEM - DESCRIPTION AND OPERATION

C 1. General

C The high frequency (HF) communication system (Ref. Fig. 1) C includes a dual control panel, two transceivers, two antenna C couplers, and a single shunt-type dual antenna. The system C provides long range voice communication with other aircraft or C ground stations. The system operating frequency range is 2.800 C to 26.999 MHz in either amplitude modulation or single sideband C modes.

C The HF system equipment and locations are as follows:

CR A dual control panel on the pilots aft center console, zone CR 210

CR Two HF transceivers in the forward electronic service C center, rear rack, top shelf, zone 113

C Two antenna couplers in the vertical stabilizer, zone 313

C A dual HF receiving and transmitting antenna which is a C structural part of the vertical stabilizer leading edge, C zone 313

C An HF fault detection panel in the forward electronics C service center, zone 113

C Integration of HF communication equipment with audio integrating C system headsets, microphones, and flight station speakers is C controlled by audio selector panels at the following positions:

C Captain

C First Officer

C Flight Engineer/Second Officer (FE/SO)

C First Observer

C Forward electronic service center

C An audio distribution unit (Ref. 23-51-00) provides C impedance matching between the transceiver and the audio C selector panels.

C The system is powered by 115V, 400 Hz, three phase and 28V dc. C The power is provided through the ESS COMMUNICATIONS - HF NO. 1 C - DC (C1) and AC (C3), and COMMUNICATION - HF NO. 2 - DC (C19)

and AC (C21) circuit breakers on the pilot's overhead circuit breaker panel CB1. System No. 1 receives ac power from the ac essential radio bus, and dc power from the dc essential radio bus. System No. 2 receives ac power from No. 2 ac radio bus, and dc power from No. 2 dc radio bus.

Automatic monitoring of incoming signals is provided by the selective calling (SELCAL) system. The SELCAL circuit is enabled when an hf system is selected on the SELCAL control panel and the HF system is energized. A received signal containing the correct code triggers the SELCAL to provide aural and visual indications in the flight station.

When the HF-1 and/or HF-2 audio controls, and the MIC SEL - HF-1 or HF-2 microphone selectors are depressed on the audio selector panels at the Captain's, First Officer's, or FE/SO position, the corresponding HF audio and microphone voice are connected to the voice recorder.

2. Operation

In the receive mode, signals from the antenna are routed through the antenna coupler to the transceiver (Ref. Fig. 2). The transceiver detects and amplifies the audio and routes it to the audio distribution unit. In the audio distribution unit the transceiver output is passed through an impedance matching network (Ref. 23-51-00) for interfacing with the five audio selector panels. From the audio selector panels, the audio is routed to the headsets, the flight station speakers, and the voice recorder system.

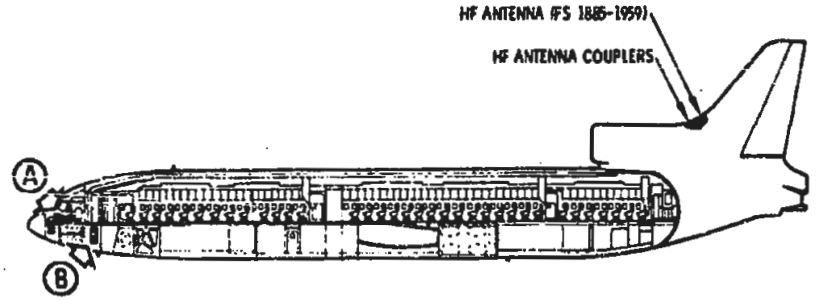
When a PTT switch is operated, the selected transceiver and coupler (No. 1 or No. 2) are keyed. A disable signal is sent to the other antenna coupler to isolate it and the other transceiver from the antenna.

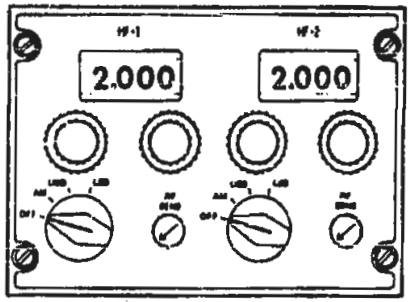
Audio from the audio integrating system microphone (Ref. 23-51-00) is routed through the audio selector panel to the selected transceiver where it is translated into RF energy.

From the transceiver, the RF is routed through the coupler to the HF antenna.

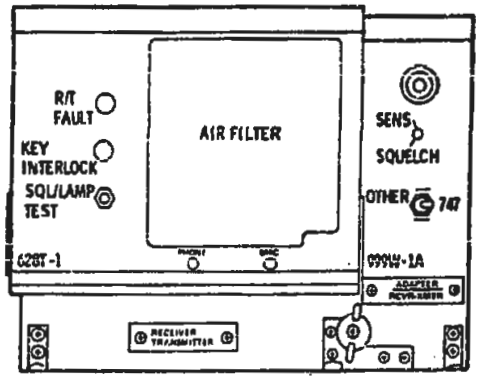
3. Control

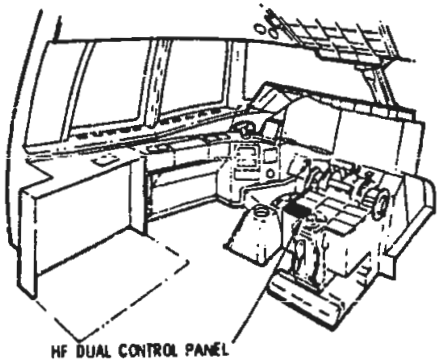
To operate HF-1 and/or HF-2 in a receive mode, position the control panel mode selector to AM or USB, select the desired frequency with the frequency select switches, and position the RF SENS control to approximately mid range. Receiver audio will then be available at the PHONE jack on the transceiver front



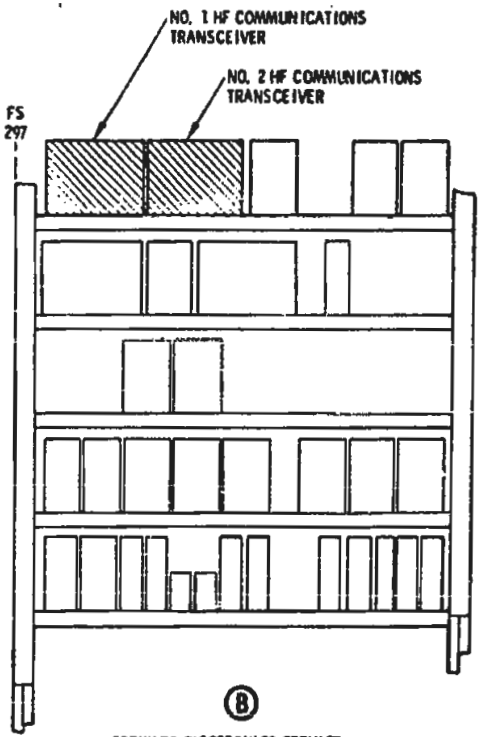


HF CONTROL PANEL

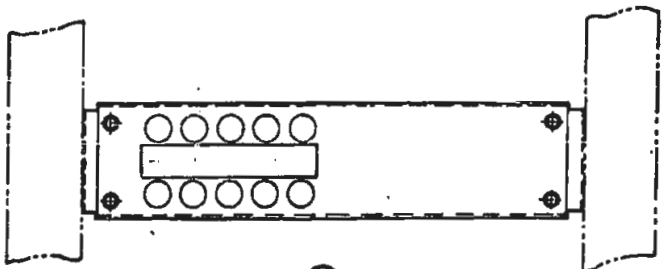




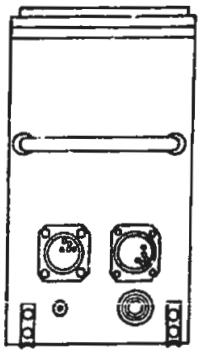
A
FLIGHT STATION



B
FORWARD ELECTRONICS SERVICE CENTER REAR RACK
LEFT SIDE VIEW LOOKING OUTBOARD



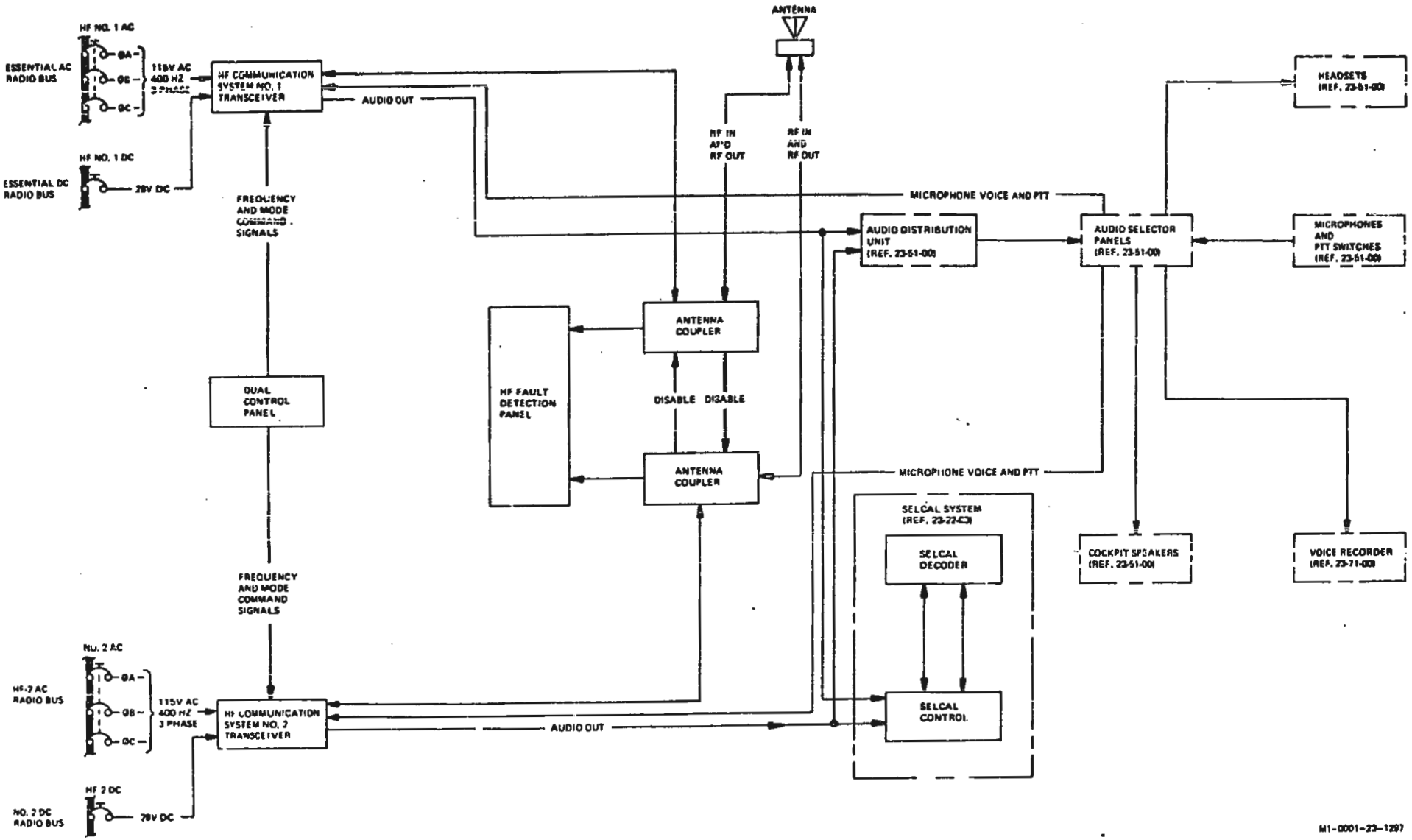
B
FORWARD ELECTRONIC SERVICE CENTER
HF FAULT DETECTION PANEL
RIGHT SIDE VIEW LOOKING OUTBOARD



HF ANTENNA COUPLER

M1-0002-23-1296

C HF Communication System Equipment and Location
C Figure 1



HF Communication System Block Diagram
Figure 2

EFFECTIVITY: HF EQUIPPED AIRCRAFT

panel. To connect receiver audio to the audio integrating system headsets, depress the HF1 and/or HF2 audio control(s) on the appropriate audio selector panel and adjust the volume as necessary.

With HF-1 or HF-2 in a receive mode, the transmitter can be operated by connecting a carbon microphone at the MIC jack on the transceiver front panel, and depressing the microphone PTT switch. To connect the audio integrating system microphone voice and keying circuits to the transmitter, depress the MIC SEL - HF-1 or HF-2 control on the appropriate audio selector panel.

4. Control Panel

A. Description

The control panel is divided into two sections. The left section contains No. 1 HF controls, and the right section contains No. 2 HF controls. Both sets of controls provide identical electrical functions for their respective circuits. Two multi-pin electrical connectors are located at the back of the panel. The connectors are designated J1 and J2 for the No. 1 HF and No. 2 HF systems, respectively. The panel face is illuminated by integral lighting (Ref. 33-14-00). The controls and their functions are as follows:

(1) Mode Selector Switch

The mode selector switches are rotary, wafer-type controls with four positions each. The positions are placarded OFF/AM/USB/LSB. Each switch position functions as follows:

(a) OFF - removes ac and dc power from the HF equipment.

(b) AM - switches power supplies on and sets the transceiver for amplitude modulation operation.

(c) USB - switches power supplies on and sets the transceiver for upper sideband operation.

(d) LSB - INOPERATIVE -- The 628T transceiver operates in the USB mode only.

(2) RF SENS control

The RF SENS control is a linear 5 kilohm potentiometer which provided a manual receiver gain control. The

potentiometer is connected to the receiver squelch circuit.

(3) Frequency Selector Controls

The frequency selector controls include four pairs of switches, two pair for each HF system. Each switch pair has an inner and an outer control. These controls provide frequency selections between 2.000 and 29.999 MHz in 1 kHz steps for each HF system. Digital-type display windows in the control panel show the frequencies selected by the four controls. The control pairs operate with the display windows in the following manner:

(a) Left outer control knob - selects 1 MHz steps.

(b) Left inner control knob - selects 100 kHz steps.

(c) Right inner control knob - selects 10 kHz steps.

(d) Right outer control knob - selects 1 kHz steps.

5. Antenna

A. Description and Operation

The HF communication system transmits and receives through a flush-mounted, shunt-type antenna. The antenna is located in the base of the vertical stabilizer leading edge between FS 1885 and FS 1959 (Ref. Fig. 1). The antenna dielectric portion is constructed of fiberglass honeycomb. The antenna is sandwiched and bonded between laminated fiber glass formed to the vertical stabilizer contour.

The antenna conductor is an aluminum strip that is attached to the fiber glass leading edge. The lower end of the conductor is welded to an aluminum tube that is pressed flat at the opposite end. A nut plate attached to the flat surface provides the circuit attaching point for both HF couplers. The upper end of the antenna conductor is attached to the aircraft structure. A transmission connection is provided at the attachment point.

The antenna conductor, which is located at a low impedance point in the circuit, acts as a type of inductive coupling so that the airframe operates as an antenna.

6. Transceiver and Adapter

A. Description

Two identical transceivers (No. 1 and No. 2) are used in the HF communication system.

The transceivers are mounted in an adapter mounting that provides for use in aircraft provisions designed for Collins 618T (1 ATR) units. The 999W-1A adapter (Figure 3) is an L-shaped unit that is used with the 628T-1 in 618T provisions. To compensate for slight variations in microphone audio common wiring on these aircraft, a switch is installed on the front panel of the adapter to select proper audio grounding associated with the aircraft. When installing this unit, make sure that the switch is positioned to the proper aircraft installation; i.e. "B707" or "OTHER" for the L-1011-100. Placing the switch in the incorrect position can cause excessive noise and hum in the HF Transmitter. The unit has a single DPX connector that interfaces with the 628T-1, and a single DPE connector that interfaces with the aircraft connector. Antenna coax connection is made at the coax receptacle on the 999W-1A adapter.

The modular construction and swing-out features of the transceiver provide easy access to components for maintenance purposes. Cooling air is provided for the transmitter section by an internal blower. The entire unit is enclosed by a slip-on dust cover that is secured by quarter-turn fasteners.

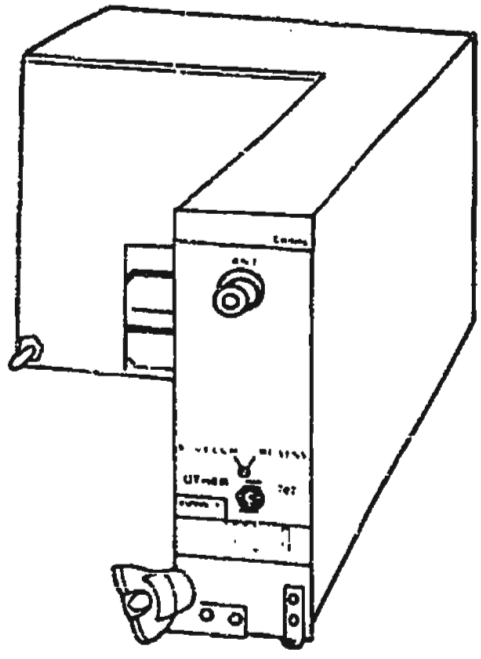
The transceiver front panel contains two jacks, two lamps and a pushbutton switch. The designations and function of these are as follows:

(1) PHONE jack - provides a plug-in facility for a 600 ohm headset to monitor audio during tests.

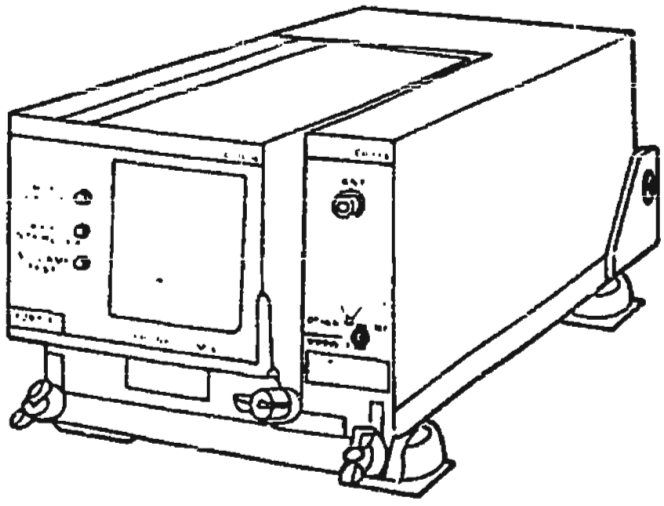
(2) MIC jack - provides a plug-in facility for a carbon microphone to enable voice modulation tests at the transceiver.

(3) R/T FAULT lamp - indicates frequency synthesizer out of lock, low transmitter power output or low power supply voltage.

(4) KEY INTERLOCK lamp - yellow lamp lights when transceiver is keyed if fault exists in antenna coupler. 628T-1 cannot transmit during this time.



999W-1A



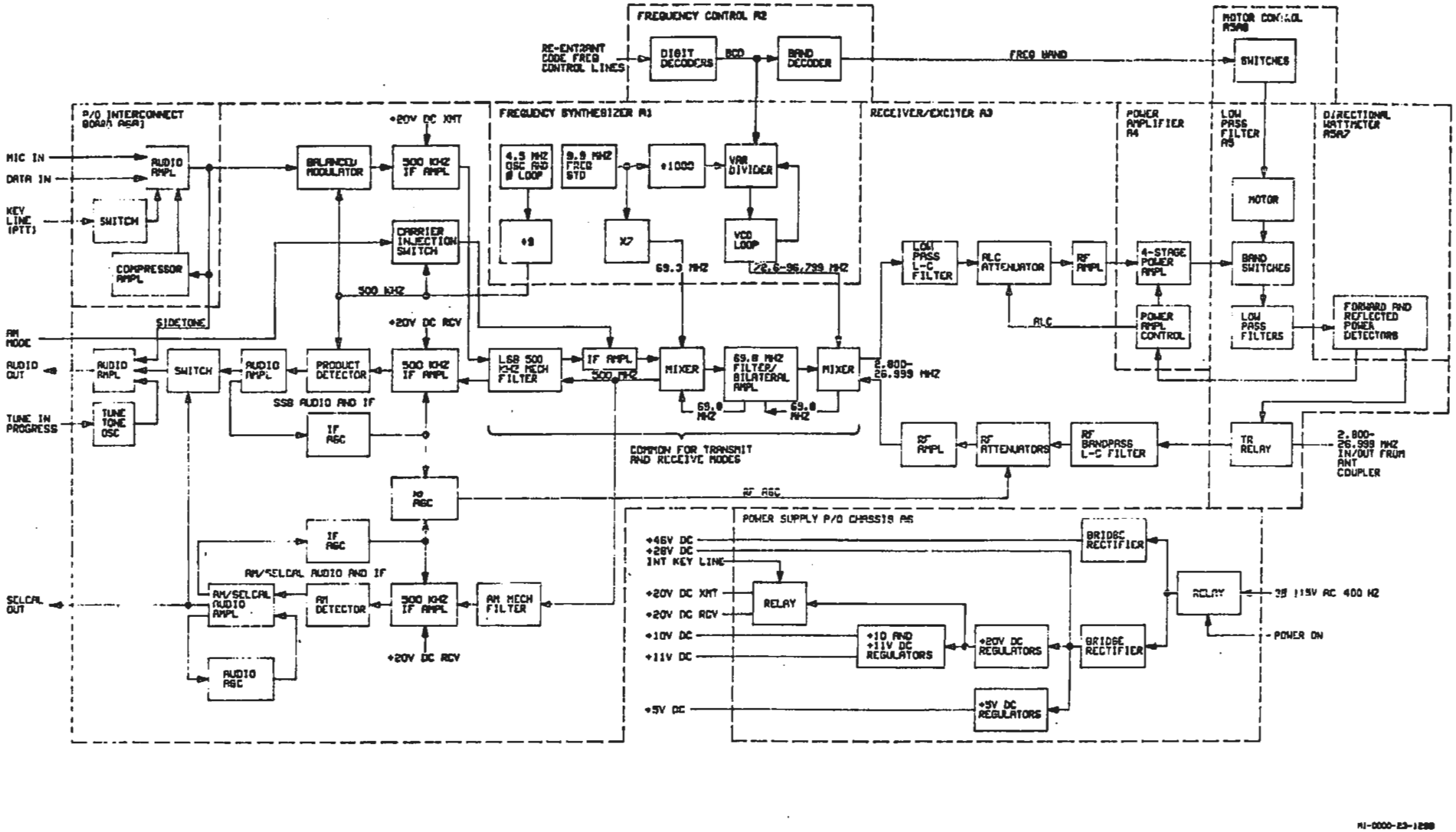
628T-1 AND 999W-1A

C
C
C

628T-1 HF Receiver-Transmitter,
999W-1A Rcvr-Xmtr Adapter
Figure 3

EFFECTIVITY: HF EQUIPPED AIRCRAFT

0038



AI-0000-23-1280

C 628T-1 HF Receiver-Transmitter,
C Overall Block Diagram
C Figure 4

EFFECTIVITY: HF EQUIPPED AIRCRAFT

003B

The 628T-1 is a transceiver that provides communications in the high-frequency band for airborne applications. Controlled by a remote radio set control, the 628T-1 provides 24,200 operation channels with 1-kHz channel spacing, from 2.800 to 26.999 MHz. The 628T-1 has the capability to process voice and data signals in both narrow-band single sideband (SSB) and compatible AME (full carrier SSB) modes.

Internal transmitter excitation and receiver injection frequencies are generated by a dual-loop phase-locked digital synthesizer. The transmitter output is nominally 200 watts peak envelope power (pep) with a maximum average power of 100 watts. During the tune cycle of the external antenna coupler, the transmitter output is nominally 50 watts. The 628T-1 has a dual-conversion receiver that provides 200-mW received voice audio and 0.5-volt SELCAL audio outputs, and a 200-mW sidetone audio output.

An INVALID FREQUENCY "beeper" is incorporated. When the H.F. control unit is selected to a frequency below 2.8 MHz or above 26.999 MHz, a pulsed 1000 Hz tone will be injected into the receiver section audio output circuit and will be heard when the appropriate HF audio switch is selected on the audio selector panels. The presence of the "beeper" serves to alert flight crew or maintenance personnel that an invalid "aeronautical" frequency has been selected.

B. Operation

Figure 4 is an overall block diagram of the 628T-1 that shows the inter-relationship between the major assemblies. The following discussion describes the overall operation of the 628T-1.

(1) Power Control and Frequency Selection

When the function switch on the remote radio set control is turned on, it provides a signal that causes a relay to energize in the power supply of chassis A6. The relay contacts apply the 3-phase, 115-volt, 400 Hz primary power to two bridge rectifiers. The bridge rectifiers produce +46- and +28-volt dc outputs. The +28-volt dc is used by regulators to produce +5-, +10-, +11- and +20-volt dc outputs. The +20-volt dc is routed through a relay to the receiver and switched to the transmitter exciter when the transmitter is keyed.

The operating frequency of the 628T-1 is selected on the remote radio set control and supplied in ARINC reentrant code format to frequency control A2. Within frequency control A2, each digit of the operating

frequency is decoded and converted to the bcd equivalent. The bcd frequency data is applied to a frequency band decoder and to frequency synthesizer A1.

The band decoder determines which one of six bands the selected operating frequency is within, in the 2.8- to 26.999-MHz frequency range. The frequency band signal is then applied to transistor switches in motor control A5A8. These switches apply operating voltage to the motor in low-pass filter A5. The motor drives rotary switches to select one of six low-pass filters that correspond to the frequency band selected. These filters are used in the transmitter portion of the 628T-1.

Within frequency synthesizer A1, the bcd frequency data is applied to variable dividers in a dual phase-locked loop. The 72.6- to 96.799-MHz output signal from the vco loop is the local oscillator signal to a mixer in receiver/exciter A3. Frequency synthesizer A1 has two other output signals; a 500-kHz signal and a 69.3-MHz signal. The 500-kHz signal is derived from a 4.5-MHz oscillator whose output is divided-by-nine. The 500-kHz signal is used with a product detector, balanced modulator, and carrier injection switch in receiver/exciter A3. The 69.3-MHz signal, the seventh harmonic of the 9.9-MHz frequency standard, is used with a mixer in receiver/exciter A3.

When the operating frequency is selected on the radio set control, a rechannel signal is sent to the external antenna coupler. This signal causes the antenna coupler to return to its home position. Before the 628T-1 can be used for communications, the antenna coupler must be tuned to the selected operating frequency. Tuning of the antenna coupler is initiated when the key or push-to-talk (ptt) switch on the microphone is momentarily activated. During tuning, the antenna coupler supplies a tune-in-progress (TIP) signal to the 628T-1 and holds the key line down until tuning is complete. Within the 628T-1, the TIP signal produces the following results: the transmitter is placed in the AM mode with half-power (50 watts), and the tune tone oscillator produces a 1000-Hz output to the external audio system. When tuning is complete, the TIP signal is removed from the 628T-1, the coupler unkeys the trans- mitter, and the 628T-1 returns to the receive mode. With the antenna coupler tuned to the selected operating frequency, the 628T-1 may now be used for communications.

C If the antenna coupler fails to tune properly,
C transmission will be inhibited. In this situation,
C when the key or ptt switch is activated, the KEY
C INTERLOCK lamp on the 628T-1 front panel will light to
C indicate an antenna coupler fault.

C (2) Transmit Mode

C In transmit mode, the 628T-1 will produce nominally 200
C watts pep RF output in SSB operation and a nominal 100
C watts average RF output in AME operation. Both voice
C and data audio signals may be used to modulate the RF
C carrier.

C When the key or ptt switch on the microphone is
C activated, a relay in the power supply of chassis A6
C switches +20-V dc power to the transmitter circuits in
C receiver/exciter A3. The key or ptt signal is also
C applied to a transistor switch that enables the audio
C amplifier in interconnect board A6A1. The audio
C amplifier, whose gain is controlled by a compression
C amplifier, supplies a constant audio peak voltage
C output to a balanced modulator in receiver/exciter A3.
C The constant optimum audio level reduces the
C intermodulation products generated in the modulator. A
C part of the audio output from the audio amplifier is
C the sidetone signal that is applied to an output audio
C amplifier in receiver/exciter A3. Thus, the audio
C being used to modulate the transmitter can be heard on
C the audio output system.

C Within the balanced modulator, the audio signal
C modulates the 500-kHz injection signal from frequency
C synthesizer A1. The 500-kHz output of the modulator is
C amplified by an IF amplifier whose output is applied to
C a lower sideband (LSB) mechanical filter. The filter
C removes the upper sideband (USB) and 500-kHz carrier
C and passes only the lower sideband. Another IF
C amplifier then amplifies the LSB signal to a level
C adequate to drive the first mixer of the up-converting
C frequency translator. When transmitting in AME mode,
C this IF amplifier also receives a 500-kHz carrier
C signal, from frequency synthesizer A1, through a
C carrier injection switch.

C Within the first mixer, the LSB signal (and 500-kHz
C carrier, if in AME mode) is mixed with the fixed
C 69.3-MHz signal frequency synthesizer A1. Only the
C 69.8-MHz output of the mixer passes through a 69.8-MHz
C crystal filter and then into a second mixer. Within
C the second mixer, the 69.8-MHz signal is mixed with the
C variable 72.6- to 96.799-MHz signal from frequency

C synthesizer A1. The resulting output of the second
C mixer is a 2.800- to 26.999-MHz signal. Due to the
C high side injections into the mixer, the LSB input
C becomes the USB output. Thus, within the dual mixer
C circuit, the 500-kHz LSB signal is first translated up
C to 69.8 MHz, and then the 69.8-MHz signal is translated
C down to the 2.800- to 26.999-MHz USB signal. It should
C be noted that the LSB mechanical filter, 69.8-MHz
C crystal filter, and two mixers are also used in the
C receiver of the 628T-1, and will be discussed later

C The output from the second mixer is filtered by a
C low-pass (LC) filter and applied to an rf amplifier
C through an automatic load control (ALC) attenuator.
C The nominally 20-milliwatt pep output of the rf
C amplifier is then applied to a 4-stage power amplifier
C in power amplifier A4. The power amplifiers raise the
C 20-milliwatt pep input to a nominally 200-watt pep
C output that is applied to low-pass filter A5. Power
C amplifier A4 has protective circuits that provide
C almost instantaneous shutdown of the power amplifiers
C in the event of excessive power amplifier internal
C power dissipation.

C Within low-pass filter A5, the RF signal is routed
C through one of six filters that has been selected, by
C the motor-driven rotary band switches, for the
C operating frequency band. These six fixed-tuned,
C low-pass filters cover the frequency band from 2.8 to
C 26.999 MHz and remove the harmonics of the output
C frequency.

C The 200-watt pep RF output from the low-pass filter is
C routed through directional wattmeter A5A7 and a
C transmit-receive relay to the external antenna coupler.
C Forward and reflected power detectors, within
C directional wattmeter A5A7, provide voltages that are
C used to generate the ALC signal and to drive the power
C amplifier protection control circuit. The relay
C disconnects the receiver from the antenna coupler and
C connects the transmitter to the antenna coupler.

C It should be noted that whenever the 628T-1 is in the
C transmit mode, an internal blower provides forced-air
C cooling to the transmitter circuits to prevent
C overheating.

C (3) Receive Mode

C In the receive mode, the 628T-1 receives 2,800- to
C 26.999-MHz USB and AM signals from the external antenna
C coupler. The receiver uses dual conversion to provide

200-mW received voice audio and 0.5-V SELCAL audio outputs. The receiver also provides a 200-mW sidetone audio output during transmit mode.

The 2.800- to 26.999-MHz signal from the antenna coupler is routed, through the transmit-receive relay in low-pass filter A5, to RF bandpass LC filter in receiver/exciter A3. The filter output is applied to a push-pull RF amplifier through an AGC-controlled pin diode rf attenuator. The output from the RF amplifier is then routed through the mixers and filters that are used in the receiver, as previously mentioned.

In the first mixer, the 2.800- to 26.999-MHz output from the RF amplifier is mixed with the variable 72.6- to 96.799-MHz signal from frequency synthesizer A1. If the received RF signal was a USB signal, the output of the mixer will be LSB, due to the high side injection into the mixer. Only the 69.8-MHz output of the mixer passes through a 69.8-MHz crystal filter and then into a second mixer. Within the second mixer, the 69.8-MHz signal is mixed with the fixed 69.8 MHz signal from frequency synthesizer A1. The 500-kHz mixer output then branches to either the SSB or AM IF sections of the receiver.

In SSB operation, the output of the mixer is applied to the LSB 500-kHz mechanical filter. The LSB output of the filter is amplified by the IF amplifiers and then applied to the product detector. Within the product detector, the LSB signal is combined with a 500-kHz injection signal from frequency synthesizer A1. The output of the product detector is the detected audio signal. The audio signal is amplified by an audio amplifier whose output is then switched to the final audio amplifier. The 200-mW output of the final audio amplifier is applied to the external audio system. The output of the first audio amplifier is also used to develop the AGC voltage for the IF amplifiers. The IF AGC voltage is also used to develop the RF AGC voltage to control the input RF attenuators.

In AM operation, the output of the mixer is applied to an AM mechanical filter that is capable of passing both the LSB and USB signals. The 500-kHz output of the filter is amplified by the IF amplifiers and then applied to the AM envelope detector. The audio output of the detector is amplified by an AGC-controlled AM/SELCAL audio amplifier whose output is then switched to the final audio amplifier. The 200-mW output of the final audio amplifier is applied to the external audio system. If a SELCAL signal has been received, the

C 0.5-V audio signal is not switched but is applied
C directly to the external SELCAL audio system. The
C output of the first audio amplifier is also used to
C develop the AGC voltage for the IF amplifiers. The IF
C AGC voltage is also used to develop the RF AGC voltage
C to control the input RF attenuators.

C The final audio amplifier has two other inputs. While
C the external antenna coupler is tuning, the 1000-Hz
C signal from the tune-tone oscillator is amplified. The
C other input is the sidetone signal that is produced
C during transmit mode.

C (4) Front Panel Controls and Indicators

C The front panel of the 628T-1 has two lamps and a
C pushbutton switch. The front panel of the 999W- 1A
C Recvr-Xmtr Adapter has a 2-position switch that is
C operated using a screwdriver and a toggle switch for
C microphone ground circuit selection.

C The two lamps on the 628T-1 are the KEY INTERLOCK and
C R/T FAULT lamps. The KEY INTERLOCK lamp will light
C when keying the transmitter if the external antenna
C coupler has failed to tune properly. When this lamp is
C on, transmission is inhibited. The R/T FAULT lamp will
C light when the internal monitoring circuit detects a
C 628T-1 fault. The faults that will light this lamp
C are: the frequency synthesizer is out of lock; low
C transmitter power output (60 watts pep nominal
C threshold) in AME transmit mode; and low voltage from
C the +5-, +10- or +20-V dc power supplies.

C The pushbutton switch on the 628T-1 is the SQL/LAMP
C TEST switch. When pressed, the KEY INTERLOCK and R/T
C FAULT lamps should light and the squelch circuit in
C receiver/exciter A3 is disabled.

C One switch on the 999W- 1A is the SQUELCH/RF SENS
C switch. This switch must be positioned so that the
C 628T-1 will interface properly with the particular type
C of remote radio set control that is being used. This
C switch must be in RF SENS position for proper interface
C with the G-1978 HF control.

C 7. Antenna Coupler

C A. Description

C Two identical antenna couplers are located in the vertical
C stabilizer, zone 313, directly under the HF antenna and

above the maintenance catwalk. The transistorized coupler is housed in a rack-mounted, pressurized case. Electrical connection is provided through two connectors on the front of the unit. The RF connection is through a coaxial plug on front panel labeled RF INPUT. The antenna connection is at the rear of the unit.

The pressurized case has two sections divided by a shield which provides thermal protection and RF isolation. The forward compartment contains tuning control modules, a dual servoamplifier, and the power supplies. Integrated circuit construction is used in the servoamplifier and tuning control modules. The rear section of the coupler (the RF compartment) contains the tuning elements, a discriminator module, and an isolation amplifier. The tuning elements include two variable vacuum capacitors and a variable inductor, associated motors, gear trains, switches, and RF relays.

Protection circuits in the coupler open the transceiver key interlock and remove RF power from the servoamplifier circuits when any one the the following occurs:

The coupler fails to home within 15 seconds.

The coupler fails to tune within 15 seconds.

An Arc is detected in the coupler.

The opposite coupler is in use and providing a DISABLE signal.

Circuits are provided for remote indication of coupler performance. The following indications are displayed on the HF fault detection panel in the forward electronic service center zone 113:

COUPLER FAULT - coupler failed to home or tune within 15 seconds.

RF FAULT - lack of RF power due to a defective transceiver, open coaxial cable, or insufficient power to allow coupler to tune.

PRESSURE FAULT - low pressure in coupler case.

TUNE IN PROCESS - coupler is in tune mode.

OPERATE - coupler has tuned.

The coupler matches the antenna impedance to the transmitter in two related coupler tuning operations, phasing and

C loading. A complete tuning sequence (Ref. Fig. 5) occurs in
C a series of steps to position the following:

C Tuning element assemblies

C Shunt capacitor

C Series capacitor

C Shunt coil assembly

C The transceiver and control panel provide keying and
C frequency band information (in the form of ground return
C circuits) to the antenna coupler relay assembly. When the
C transceiver is keyed, the RF output and a ground return are
C applied to the coupler to initiate a tuning cycle. During a
C complete tuning cycle, a 1 kHz tone is heard in the headset,
C and the coupler locks the key line. The key line remains
C closed until the transceiver power amplifier and the coupler
C have automatically fine tuned.

C B. Operation

C Three operations are required to match the antenna to the
C transmitter: sensing, control, and tuning. All three occur
C at the same time in the coupler. After RF power is applied
C to the coupler, the discriminator samples the coupler
C antenna input and develops dc voltages. These voltages are
C proportional to the following:

C The reactive component (phasing error)

C The 50 ohm impedance component (loading error)

C The forward power level

C The reflected power level

C The two error signals indicate the degree of antenna
C mismatch to the servo control circuits, so that commands can
C be made for corrective tuning action. The forward and
C reflected power levels are used by the control circuits to
C determine the tuning sequence start and completion. To
C initiate and govern the corrective tuning action, the
C control circuits continually decode the sensed signals and
C all other control inputs. This includes such inputs as band
C information, key and tune commands, and equipment enable.

C A complete tuning sequence consists of five basic steps.
C These steps are:

C Home

C Standby

C Tune

C Operate

C Fault

C The first four steps are controlled by a sequence counter
C which can only advance to a new position if the conditions
C of the existing steps are satisfied. When a fault sensor
C (fifth step) is activated, the circuit overrides all other
C steps. A brief description of each sequence follows:

C (1) Home

C When power is first applied, or when a new frequency is
C selected on the control panel, a ground is switched to
C the coupler. The coupler sets a sequence counter to
C run the elements to the home position. In this
C position (home), the series capacitor, shunt capacitor,
C and shunt coil are set to provide minimum attenuation.
C When all tuning elements reach their home position, a
C pulse is sent to the sequence counter to advance it to
C the standby position.

C (2) Standby

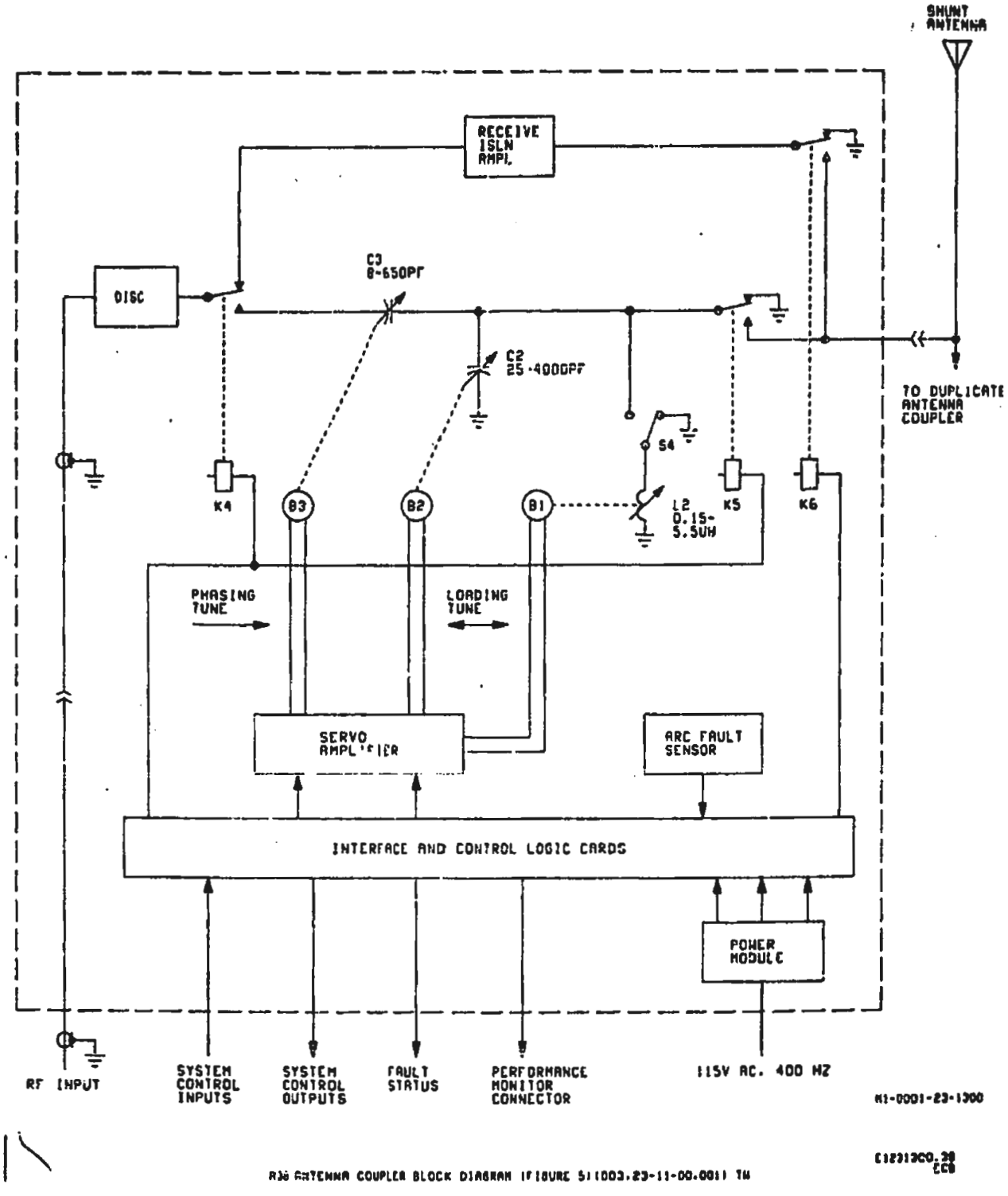
C In the standby position, the coupler is set up to
C receive and the coupler is ready to start a tune cycle
C when it receives a key line ground. The receive path
C is from the antenna through a relay switch, the
C isolation amplifier, and from the descriminator to the
C receiver. If the other coupler is keyed, the relay
C switch deenergizes and shorts the received signal to
C ground. When the coupler receives the key line ground
C return, the sequence counter advances the system to the
C tune position.

C (3) Tune

C Tuning is performed in three segments: segments A, B
C and C.

C (a) Segment A

C In segment A, the series capacitor is servo-tuned
C to a zero-phasing error position. At some
C frequencies, the series capacitor alone cannot
C produce zero phasing. In such a case, either the
C shunt capacitor or the shunt coil will be inserted
C and positioned due to band information commands so



R36 ANTENNA COUPLER BLOCK DIAGRAM (FIGURE 5)(003.23-11-00.001) TM

CR
CR

Antenna Coupler Block Diagram
Figure 5

EFFECTIVITY: HF EQUIPPED AIRCRAFT

003B

the series capacitor can produce a zero phasing error. The sequence counter then advances to segment B.

(b) Segment B

Segment B determines whether or not the shunt coil is needed for tuning. If, after segment A, the system impedance is less than the 50 ohms (negative loading) the shunt coil will not be able to resolve loading to 50 ohms. In this case, the coupler will advance to segment C. This is typical of frequencies within the 2 to 10 MHz range. If the loading error was positive after segment A, the shunt coil will be switched on the line and servo-tuned to obtain negative loading. The phasing error will be kept at zero during segment B by the series capacitor. When the phasing error is zero and the loading error is negative, the sequence counter advances to segment C.

(c) Segment C

During segment C, either the shunt capacitor or the shunt coil (as selected in segments A and B) is servo-tuned to produce zero loading error. The series capacitor is fine tuned to retain a zero phasing error. At this point, the sequence counter advances to the operate position.

(4) Operate

Upon reaching the operate sequence, the tune power and key lines unlatch and the coupler is ready to transmit and receive. If a new frequency is selected, the sequence counter advances to the home step, and the complete tuning sequence is repeated.

(5) Fault

The coupler has circuits that detect faults and provide remote indications on the fault detection panel.

8. HF Fault Detection Panel

A. Description and Operation

The HF fault detection panel contains 10 indicator lights. The panel provides remote indications of faulty system operation. Five indicator lights are for system No. 1, and

five identical indicators are for system No. 2. A decal between the indicators designates the system and circuit function for each set of the following five indicators:

(1) COUPLER FAULT

Failure of the coupler to home or tune within 15 seconds causes the COUPLER FAULT light to come on.

(2) RF FAULT

The following cause the RF FAULT light to come on: transceiver manfunction, open coaxial cable, or insufficient power. These faults all indicate a lack of RF power.

(3) PRESSURE FAULT

Low pressure in the coupler causes the PRESSURE FAULT light to come on.

(4) TUNE IN PROCESS

When the coupler is operating in the tune mode, the TUNE IN PROCESS light comes on.

(5) OPERATE

When the coupler has tuned and is ready for operation, the OPERATE light comes on.

Each indicator has a self-test feature to check the lamp when the lens assembly is pushed in.

Each set of lights receives 28V dc from the corresponding antenna coupler when power is applied to the system. When the coupler senses a fault, the sequence counter stops and operates the fault circuit to provide a ground return that causes one of the three fault indicator lights to come on. The TUNE IN PROCESS indicator receives a ground return from the coupler to cause the indicator light to come on whenever a tuning sequence is in process. The OPERATE indicator receives a ground return after the coupler has completed a sequence of home, standby, and tune, and has advanced to the operate condition.

C HF COMMUNICATION SYSTEM - FAULT ISOLATION

C 1. General

C The diagrams and schematics in this section can be used for
C fault isolation any time a fault is reported or suspected. The
C PREREQUISITES listed at the top of each fault isolation diagram
C must be satisfied prior to starting fault isolation. Uncommon
C abbreviations are defined on the using fault code diagram or
C schematic.

C If the flight crew reports a trouble using a fault code number,
C the code number can be found in the Fault Isolation Reference
C Table in the Chapter 23 Fault Code Index. The index specifies
C the exact maintenance manual section, fault isolation diagram,
C and block number on the diagram where the fault isolation
C procedure should start. Schematics are included at the end of
C the section to supplement the fault code diagrams or as an aid
C in isolating a problem not covered on the diagrams.

CR Since no fault isolation reporting system can cover every
CR possible failure symptom, additional fault isolation data are
CR provided in Step 3 HF System Component Fault Indicators and Test
CR Features and Step 4 HF System Trouble-shooting tips.

C Refer to the Maintenance Manual Introduction for a more detailed
C discussion of the Fault Isolation Reporting Method (FIRM) and
C use of fault isolation diagrams/schematics.

CR 2. Fault Isolation/Identification

CR Table 101 lists the fault isolation diagrams and schematics in
CR this section.

CR Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Transmission Problems
104	Control Problems
105	Reception Problems

CR Table 101 (Cont)

CR FIGURE	TITLE
CR SCHEM 1	HF Communication System No. 1 Schematic
CR SCHEM 2	HF Communication System No. 2 Schematic

R 3. HF System/Component Fault Indicators and Test Features

A. Fault Detection Panel - located in the Forward Electronics Service Center (FESC) (Ref. Fig. 102), provides faulty system operation indications through use of 10 lights, five for each HF system.

Each fault light comes on as noted:

(1) COUPLER FAULT light (red) - comes on if coupler fails to home or tune within 15 seconds after command is received from transceiver.

(2) RF FAULT light (red) - comes on when insufficient RF power is being received by the coupler. Possible causes are defective transceiver, loose, open or defective coaxial cable between transceiver and coupler.

(3) PRESSURE FAULT light (red) - comes on when low pressure is detected in coupler. Defective coupler.

(4) TUNE IN PROCESS and OPERATE lights (green) - come on when the coupler is in the tune mode, and after the coupler is tuned and ready for operation the OPERATE light comes on.

Before troubleshooting is started the fault indicator lights (ten) should be press-to-test on.

B. Transceiver/Adapter - contains two fault indicators (yellow), two function switches and lights, and headphone and microphone jacks; their functions are:

(1) R/T FAULT light (yellow) - comes on for following transceiver faults:

(a) Freq. synthesizer out of lock.

(b) Low transmitter power output (60 watts nominal threshold) in AM EMISSION (AME) transmit mode.

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ANTENNA – HF	1	DORSAL FIN; 313GT	23–11–02
AUDIO SELECT PANEL; CAPT	1	FLT STA; 210A	23–51–04
AUDIO SELECT PANEL; FE/SO	1	FLT STA; 210A	23–51–04
AUDIO SELECT PANEL; FESC	1	FESC; 112AB	23–51–04
AUDIO SELECT PANEL; F/O	1	FLT STA; 210A	23–51–04
AUDIO SELECT PANEL; OBSERVER	1	FLT STA; 210A	23–51–04
CIRCUIT BREAKERS			
ESS COMMUNICATION, HF NO. 1 DC (2311-CB3)	1	PILOTS OVHD CB1 PANEL; 210 (C1)	*
ESS COMMUNICATION, HF NO. 1 AC (2311-CB2)	1	PILOTS OVHD CB1 PANEL; 210 (C3)	*
COMMUNICATIONS, HF NO. 2 DC (2311-CB5)	1	PILOTS OVHD CB1 PANEL; 210 (C19)	*
COMMUNICATIONS, HF NO. 2 AC (2311-CB4)	1	PILOTS OVHD CB1 PANEL; 210 (C21)	*
CONTROL PANEL – HF; DUAL	1	FLT STA; 210A	23–11–02
COUPLER – HF ANTENNA	2	DORSAL FIN; 313FR	23–11–02
FAULT DETECTION PANEL – HF	1	FESC; 113	23–10–01
SWITCHLIGHT; MASTER RADIO, ESSENTIAL	1	PILOTS OVHD PANEL; 210	20–33–01
SWITCHLIGHT; MASTER RADIO, NO. 2	1	PILOTS OVHD PANEL; 210	20–33–01
TRANSCEIVER – HF NO. 1	1	FESC, AFT RACK; 113	23–11–01
TRANSCEIVER – HF NO. 2	1	FESC, AFT RACK; 113	23–11–01

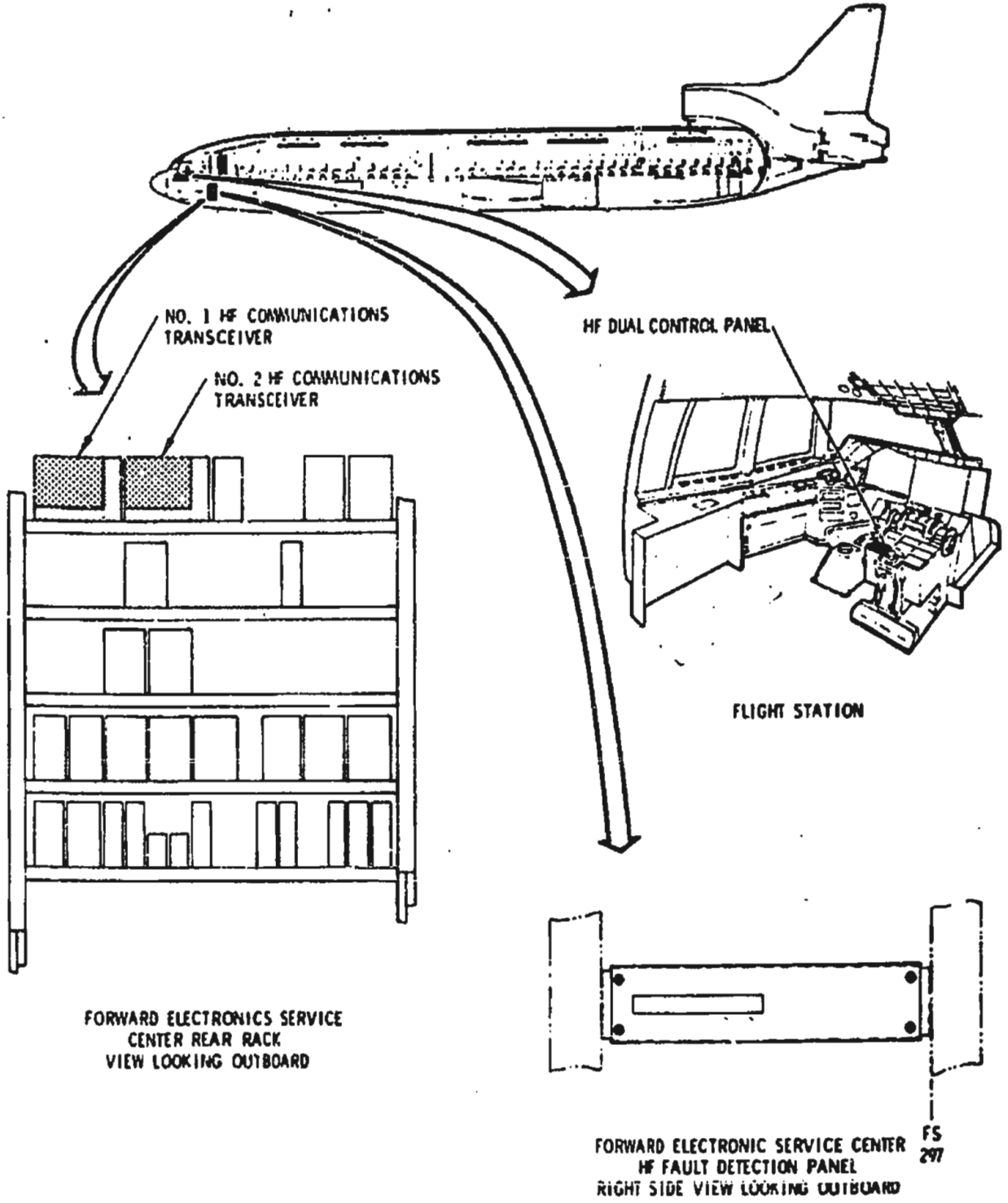
* SEE W/M EQUIPMENT LIST

M1–0001–23–181

R Component Location Index
R Figure 101

EFFECTIVITY: HF EQUIPPED AIRCRAFT

0018


NO. 1 HF COMMUNICATIONS TRANSCEIVER
NO. 2 HF COMMUNICATIONS TRANSCEIVER
HF DUAL CONTROL PANEL
FLIGHT STATION
FORWARD ELECTRONICS SERVICE CENTER REAR RACK VIEW LOOKING OUTBOARD
FORWARD ELECTRONIC SERVICE CENTER HF FAULT DETECTION PANEL RIGHT SIDE VIEW LOOKING OUTBOARD
FS 297
M1-0001-23-1312

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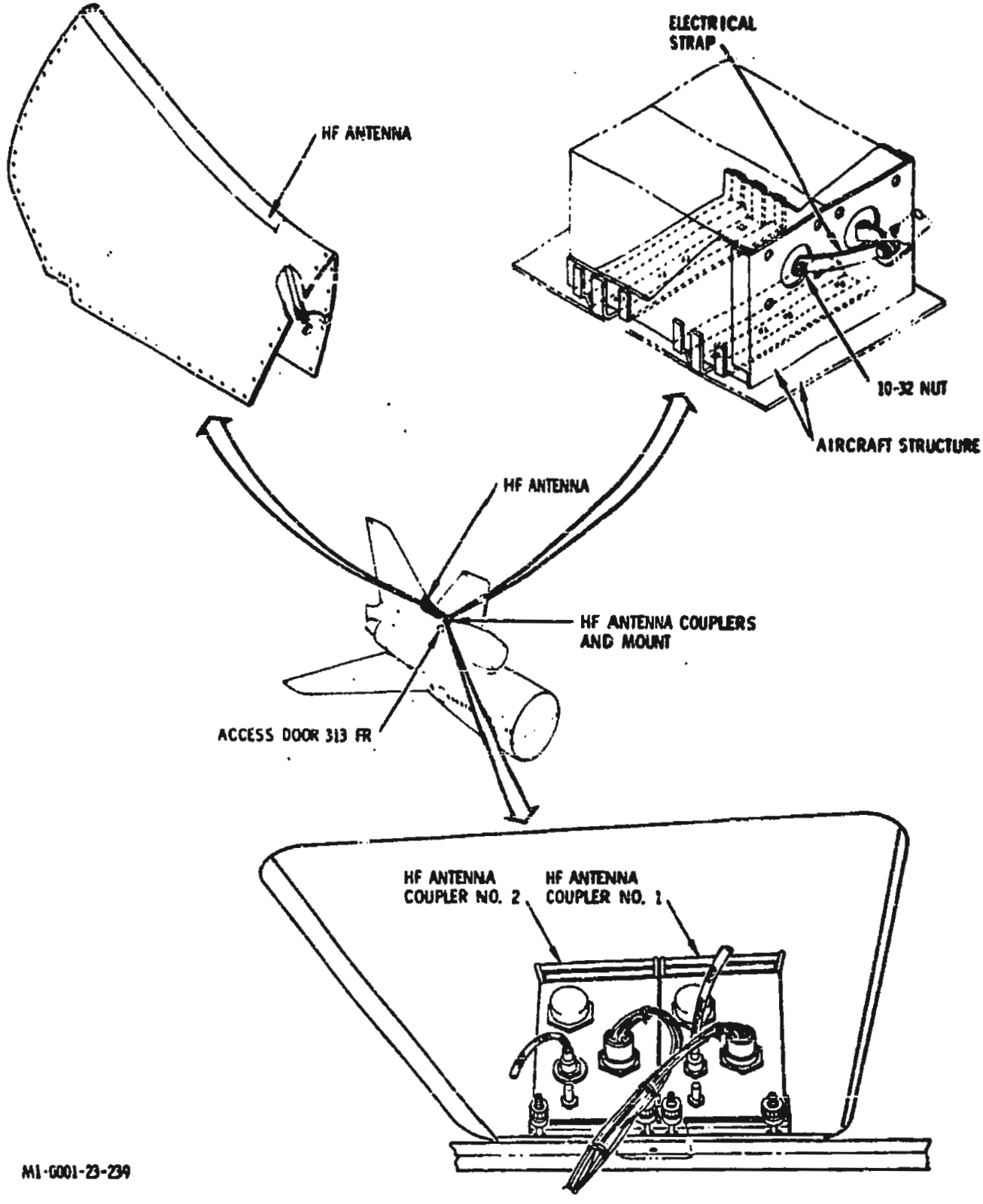
Component Locator Diagram
Figure 102 (Sheet 1)

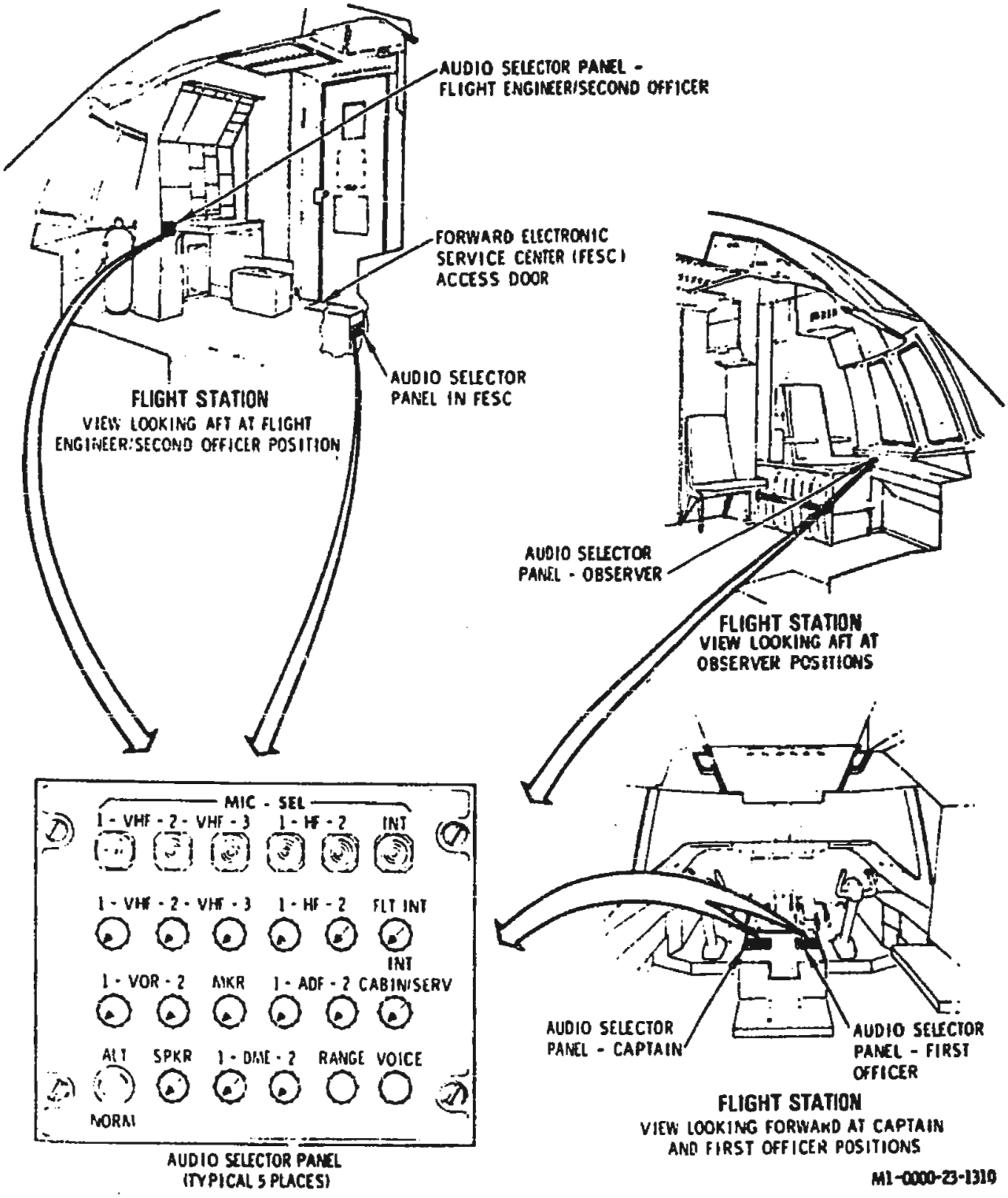
EFFECTIVITY: HF EQUIPPED AIRCRAFT

001B



CR Component Locator Diagram
CR Figure 102 (Sheet 2)

EFFECTIVITY: HF EQUIPPED AIRCRAFT


AUDIO SELECTOR PANEL - FLIGHT ENGINEER/SECOND OFFICER
FORWARD ELECTRONIC SERVICE CENTER (FESC) ACCESS DOOR
AUDIO SELECTOR PANEL IN FESC
FLIGHT STATION
VIEW LOOKING AFT AT FLIGHT ENGINEER/SECOND OFFICER POSITION
AUDIO SELECTOR PANEL - OBSERVER
FLIGHT STATION
VIEW LOOKING AFT AT OBSERVER POSITIONS
MIC - SEL
1 - VHF - 2 - VHF - 3
1 - HF - 2
INT
1 - VHF - 2 - VHF - 3
1 - HF - 2
FLT INT
INT
1 - VOR - 2
MKR
1 - ADF - 2
CABIN/SERV
ALT
SPKR
1 - DME - 2
RANGE
VOICE
NORM
AUDIO SELECTOR PANEL (TYPICAL 5 PLACES)
AUDIO SELECTOR PANEL - CAPTAIN
AUDIO SELECTOR PANEL - FIRST OFFICER
FLIGHT STATION
VIEW LOOKING FORWARD AT CAPTAIN AND FIRST OFFICER POSITIONS
M1-0000-23-1310

CR
CR

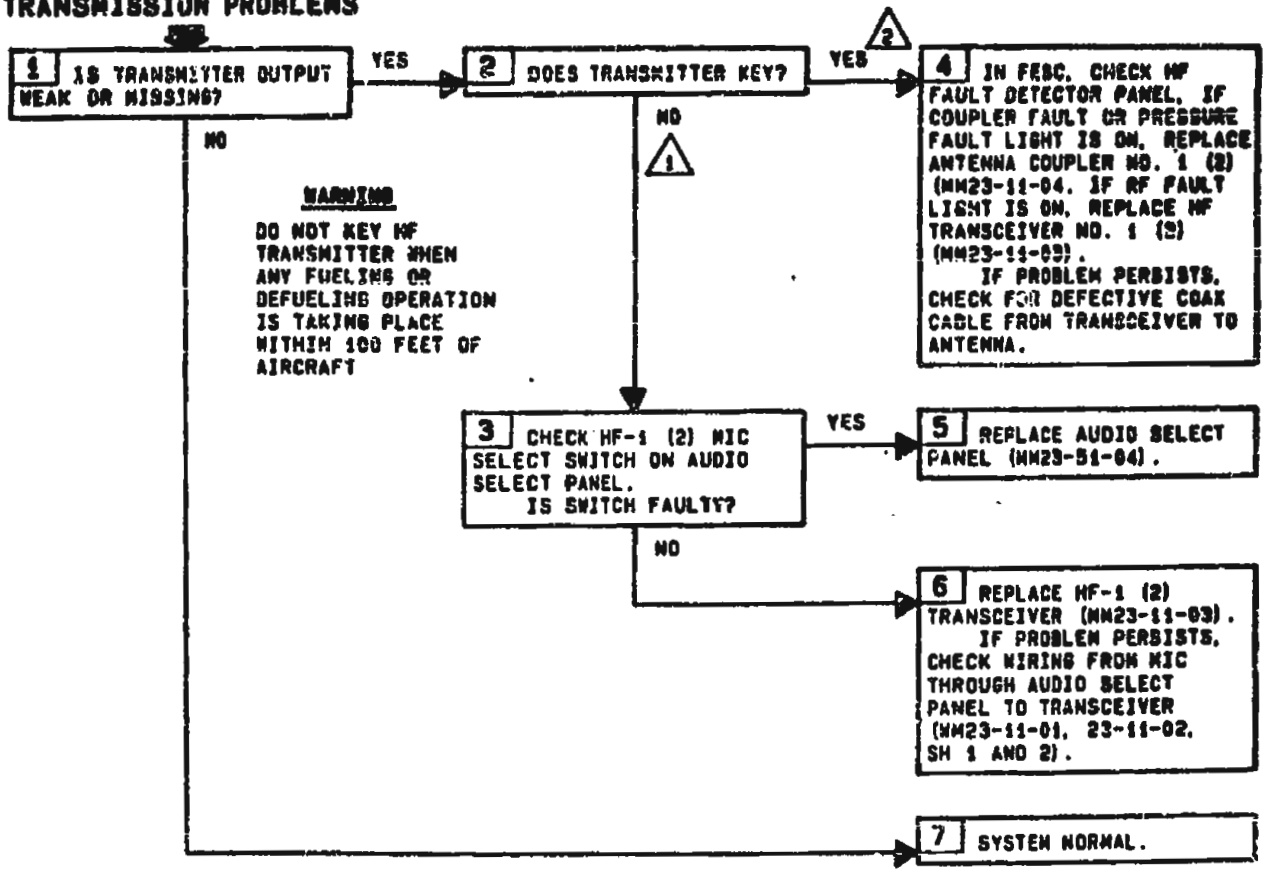
Component Locator Diagram
Figure 102 (Sheet 3)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

0018

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1C1, 1C2, 1C10, 1C21
ON PILOTS OVERHEAD PANEL:
MASTER RADIO 'ESSENTIAL' AND 'NO.2' SWITCHLIGHTS 'ON'
ON CONTROL PANEL, TURN MODE SELECTOR AS REQUIRED

TRANSMISSION PROBLEMS


1 IS TRANSMITTER OUTPUT WEAK OR MISSING?
YES
NO
2 DOES TRANSMITTER KEY?
YES
NO
WARNING
DO NOT KEY HF TRANSMITTER WHEN ANY FUELING OR DEFUELING OPERATION IS TAKING PLACE WITHIN 100 FEET OF AIRCRAFT
4 IF FEDC, CHECK HF FAULT DETECTOR PANEL. IF COUPLER FAULT OR PRESSURE FAULT LIGHT IS ON, REPLACE ANTENNA COUPLER NO. 1 (2) (MM23-11-04. IF RF FAULT LIGHT IS ON, REPLACE HF TRANSCEIVER NO. 1 (2) (MM23-11-03). IF PROBLEM PERSISTS, CHECK FOR DEFECTIVE COAX CABLE FROM TRANSCEIVER TO ANTENNA.
3 CHECK HF-1 (2) MIC SELECT SWITCH ON AUDIO SELECT PANEL. IS SWITCH FAULTY?
YES
NO
5 REPLACE AUDIO SELECT PANEL (MM23-51-04).
6 REPLACE HF-1 (2) TRANSCEIVER (MM23-11-03). IF PROBLEM PERSISTS, CHECK WIRING FROM MIC THROUGH AUDIO SELECT PANEL TO TRANSCEIVER (MM23-11-01, 23-11-02, SH 1 AND 2).
7 SYSTEM NORMAL.

△1 **NOTE**
IN ALL CASES OF NO TRANSCEIVER KEYING, OR POWER OUTPUT, FIRST TRY DIFFERENT MICROPHONE

△2 DEGRADED HF TRANSMISSION MAY RESULT FROM CORROSION ON ANTENNA TUBE CONDUCTOR AND COUPLER FEED STRAPS (REFERENCE MM23-11-02).

CAUTION

LISTEN FOR BLOWER MOTOR WHEN TRANSMITTER IS KEYED. IF MOTOR CANNOT BE HEARD WHEN TRANSMITTER IS KEYED, RELEASE PTT SWITCH AND REPAIR OR REPLACE TRANSCEIVER BEFORE CONTINUING TEST.

DO NOT TRANSMIT IN USB MODE WHEN ANOTHER AIRCRAFT WITH HF EQUIPMENT IN RECEIVE MODE IS WITHIN 250 FEET.

DO NOT KEY TRANSMITTER UNTIL 2 MINUTES WARMUP TIME HAS ELAPSED AFTER TRANSCEIVER WAS TURNED ON.

M1-0002-23-2206

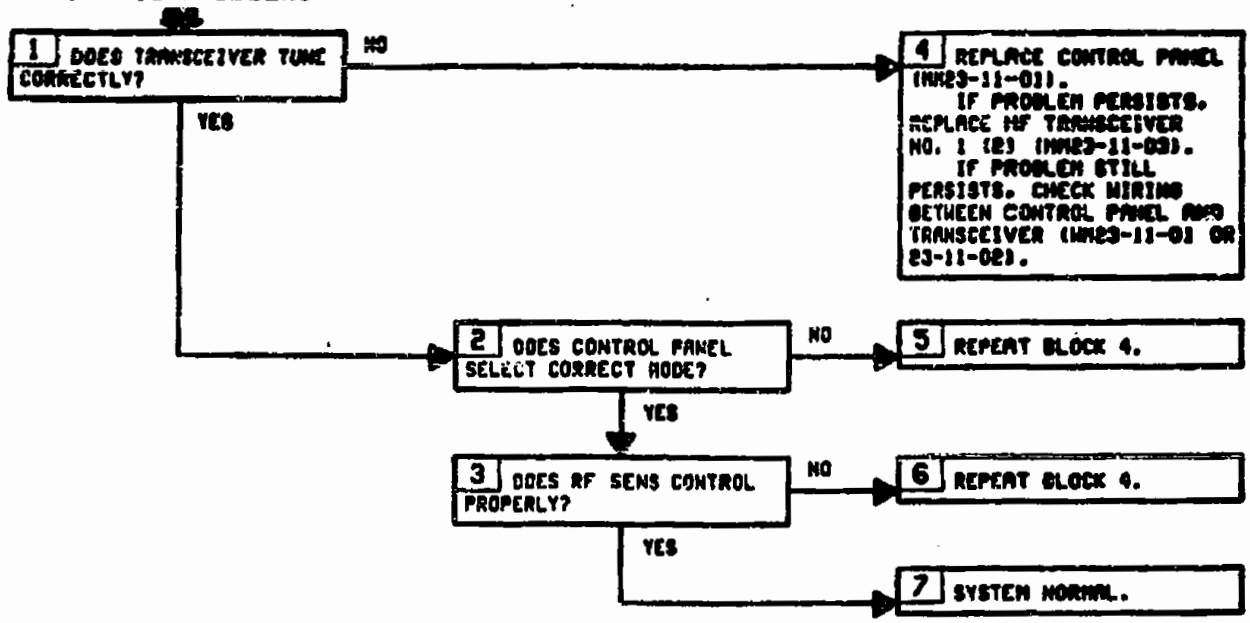
R HF Transmission Problems
R Figure 103

EFFECTIVITY: HF EQUIPPED AIRCRAFT

001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1C1, 1C3, 1C10, 1C21
ON PILOTS OVERHEAD PANEL:
MASTER RADIO "ESSENTIAL" AND "NO. 2" SWITCHLIGHTS "ON"
ON CONTROL PANEL, TURN MODE SELECTOR AS REQUIRED

CONTROL PROBLEMS

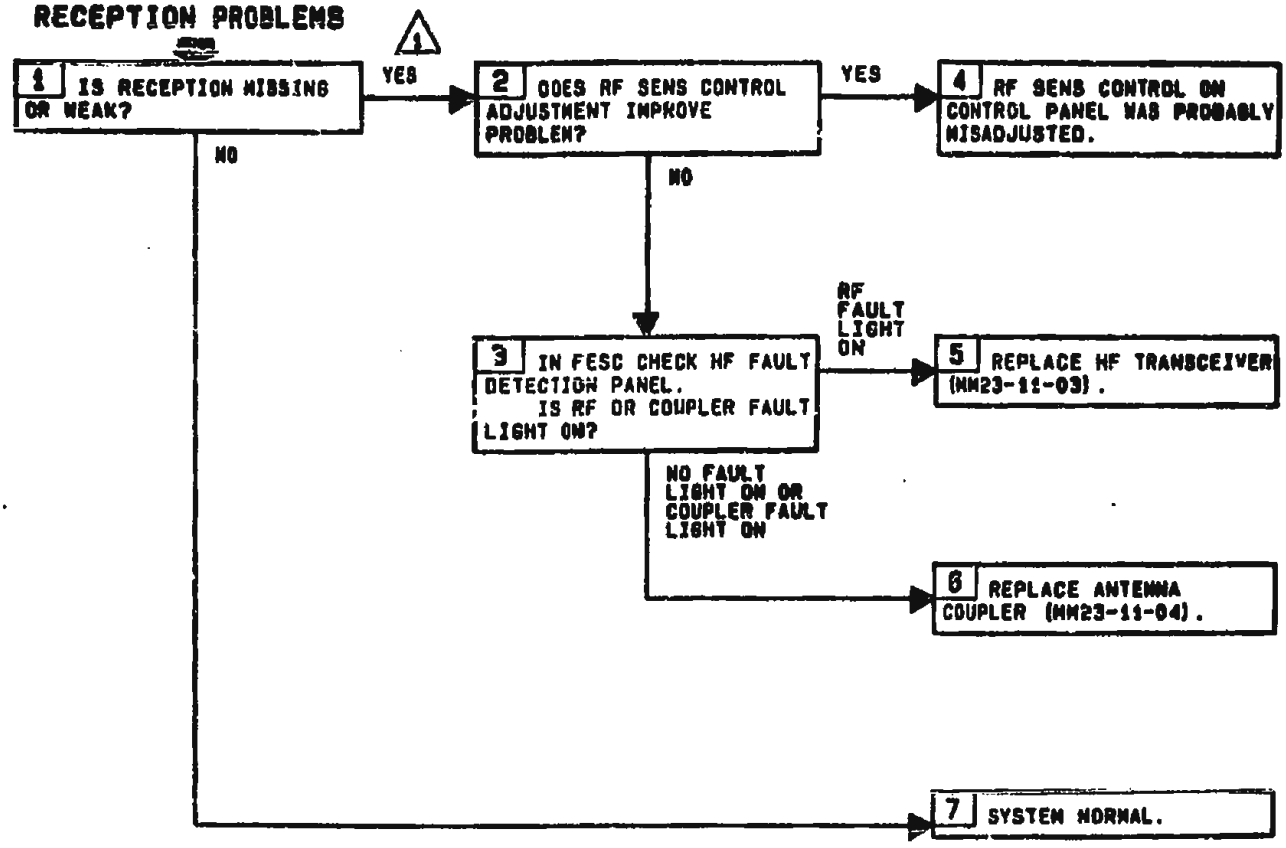

1 DOES TRANSCEIVER TUNE CORRECTLY?
NO
YES
4 REPLACE CONTROL PANEL (MM23-11-01). IF PROBLEM PERSISTS, REPLACE HF TRANSCEIVER NO. 1 (2) (MM23-11-03). IF PROBLEM STILL PERSISTS, CHECK WIRING BETWEEN CONTROL PANEL AND TRANSCEIVER (MM23-11-01 OR 23-11-02).
2 DOES CONTROL PANEL SELECT CORRECT MODE?
NO
5 REPEAT BLOCK 4.
YES
3 DOES RF SENS CONTROL PROPERLY?
NO
6 REPEAT BLOCK 4.
YES
7 SYSTEM NORMAL.

HI-0001-03-0000

R HF Control Problems
R Figure 104

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1C1, 1C9, 1C12, 1C21
ON PILOTS OVERHEAD PANEL: MASTER RADIO "ESSENTIAL" AND "NO. 2" SWITCHLIGHTS "ON"
ON CONTROL PANEL, TURN MODE SELECTOR AS REQUIRED

RECEPTION PROBLEMS


1 IS RECEPTION MISSING OR WEAK?
YES
NO
2 DOES RF SENS CONTROL ADJUSTMENT IMPROVE PROBLEM?
YES
NO
4 RF SENS CONTROL ON CONTROL PANEL WAS PROBABLY MISADJUSTED.
3 IN FESC CHECK HF FAULT DETECTION PANEL. IS RF OR COUPLER FAULT LIGHT ON?
RF FAULT LIGHT ON
5 REPLACE HF TRANSCEIVER (MM23-11-03).
NO FAULT LIGHT ON OR COUPLER FAULT LIGHT ON
6 REPLACE ANTENNA COUPLER (MM23-11-04).
7 SYSTEM NORMAL.

NOTE

1. DEGRADED HF RECEPTION MAY RESULT FORM CORROSION ON ANTENNA TUBE CONDUCTOR AND COUPLER FEED STRAPS (REFER TO MM23-11-02).

R1-0003-23-0007

R HF Reception Problems
R Figure 105

(c) Low power supply voltage (+20, +10, and +5V dc monitored).

(2) KEY INTERLOCK light (yellow) - comes on when transmitter is keyed if a fault exists in antenna coupler. Transceiver cannot transmit during this time.

(3) SQL/LAMP TEST switch - when pressed, R/T FAULT and KEY INTERLOCK lamps light and receiver squelch is disabled.

(4) SQL, SENS select switch - routes selected function from HF control panel to transceiver and grounds other function.

(5) OTHER, B747 select switch - normally in OTHER position on L-1011 aircraft, B747 position selects an isolation amplifier for interphone system used on B747 aircraft.

4. HF System Troubleshooting Tips

A. General

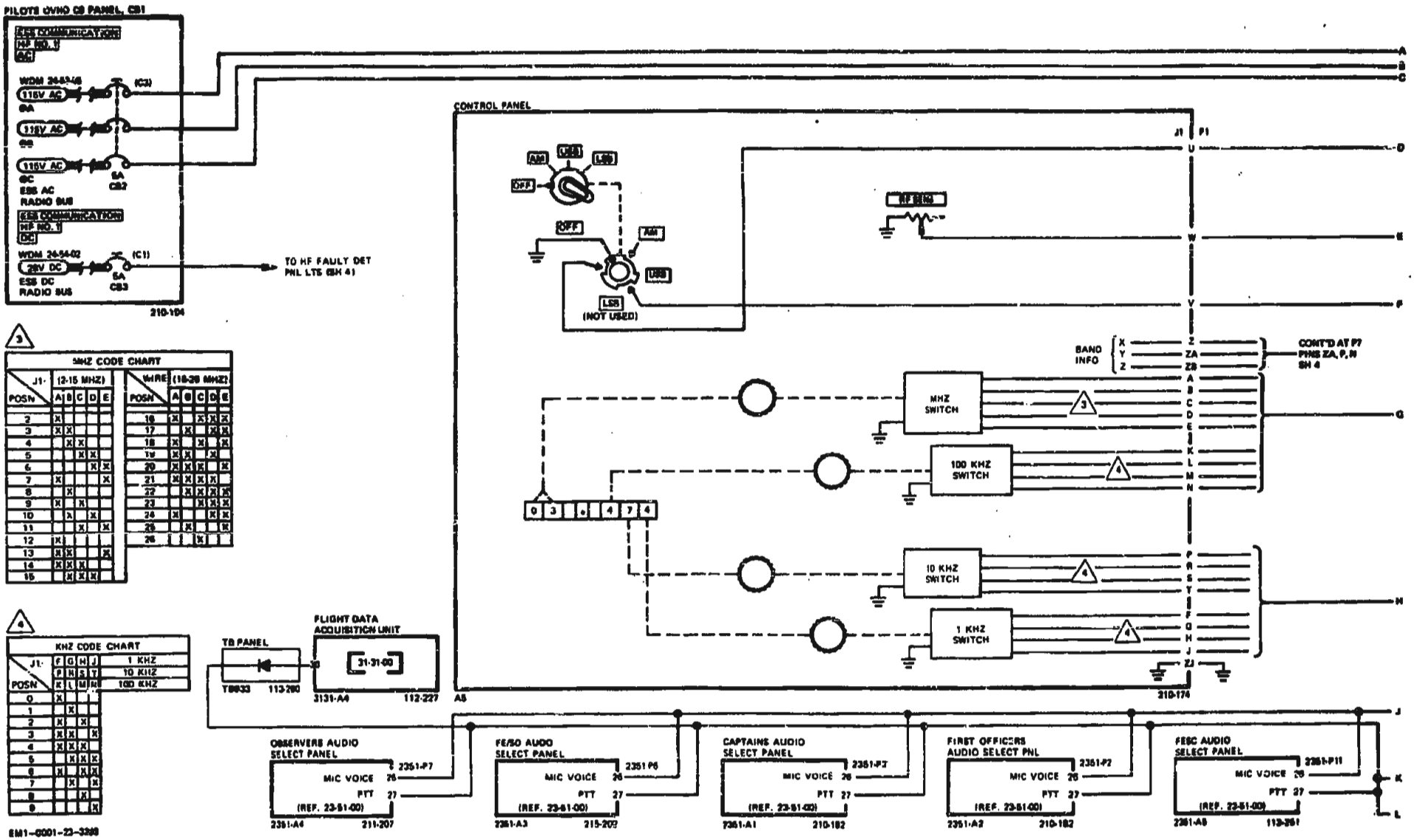
When an HF system fault is reported, the trouble can be either the transceiver, coupler, control panel or aircraft coaxial cable/wiring. With HF system powered (circuit breakers closed), check the condition of HF fault detection panel lamps, (located in FESC) push-to-test (three red, two green). If system is operating normal the green OPERATE lamp will be on. The other green lamp is on only during the tune cycle. The three red fault lamps monitor coupler and transceiver circuit conditions. The COUPLER FAULT and PRESSURE FAULT lamps, if on, indicate coupler problems. The RF FAULT lamp, if on, indicates not enough RF power from the transmitter is reaching the coupler (Ref. Paragraph 3C).

CAUTION: WHEN CHECKING CONTINUITY AND VOLTAGES AT THE CONNECTORS, DO NOT INSERT TEST PROBES DIRECTLY INTO FEMALE CONNECTOR PINS. USE A REPLACEMENT MALE PIN TO MAKE THIS CONNECTION. FAILURE TO DO SO MAY RESULT IN DAMAGED CONNECTOR PINS.

R NOTE: Corrosion or foreign matter on HF antenna feed strap
R connections can cause substandard performance of HF
R radios (reference Figures 103, 105 and MM23-11-02).

B. Receive Mode Problems

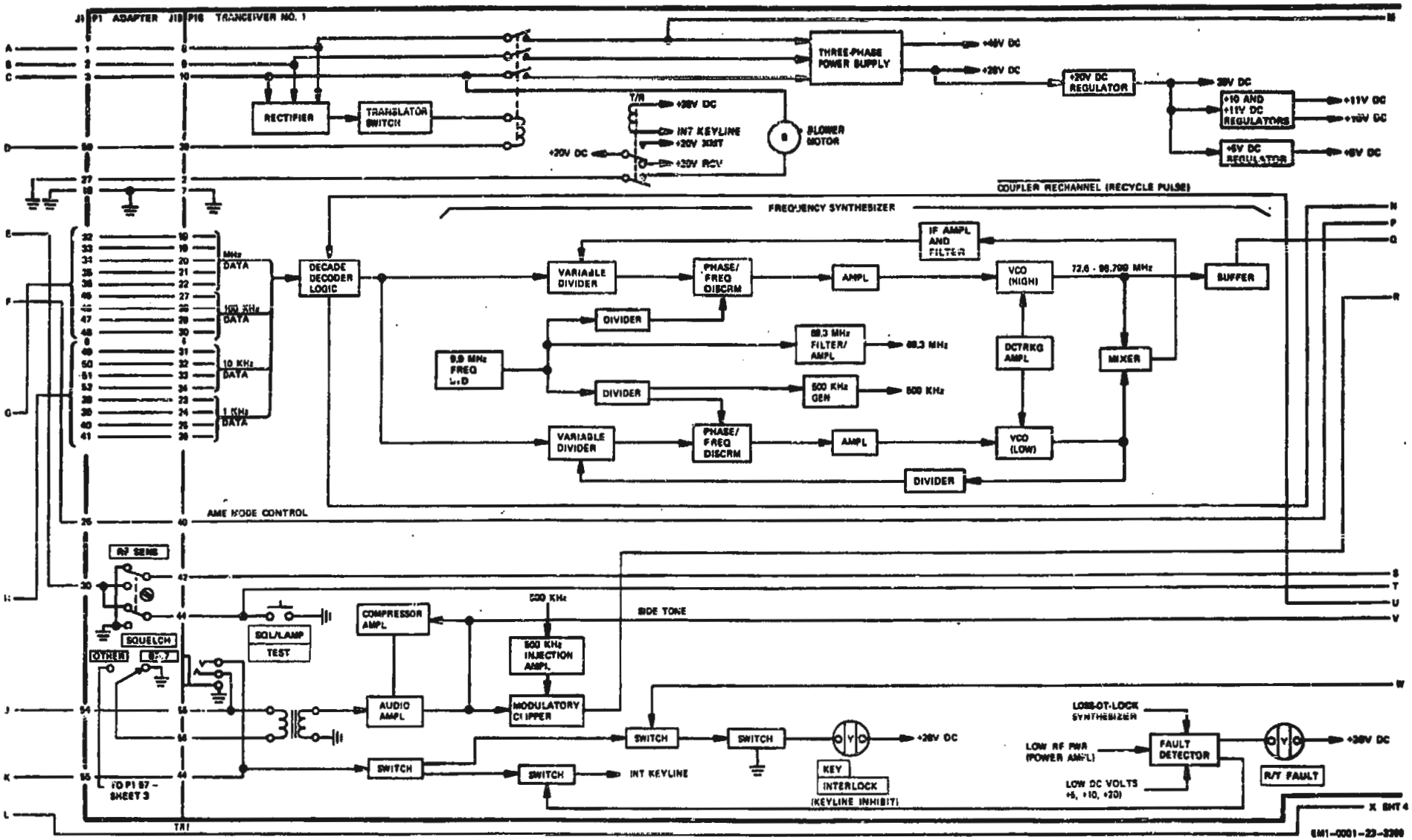
To isolate a receive mode problem, listen on various frequencies, such as WWV, 2.5, 5.0, 10.0, 15, 20 Mhz and ascertain if good reception occurs. Check and adjust RF SENS (squelch) control on HF control panel (manually changes



CR HF Communication System No. 1 Schematic
CR SCHEM 1 (Sheet 1)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

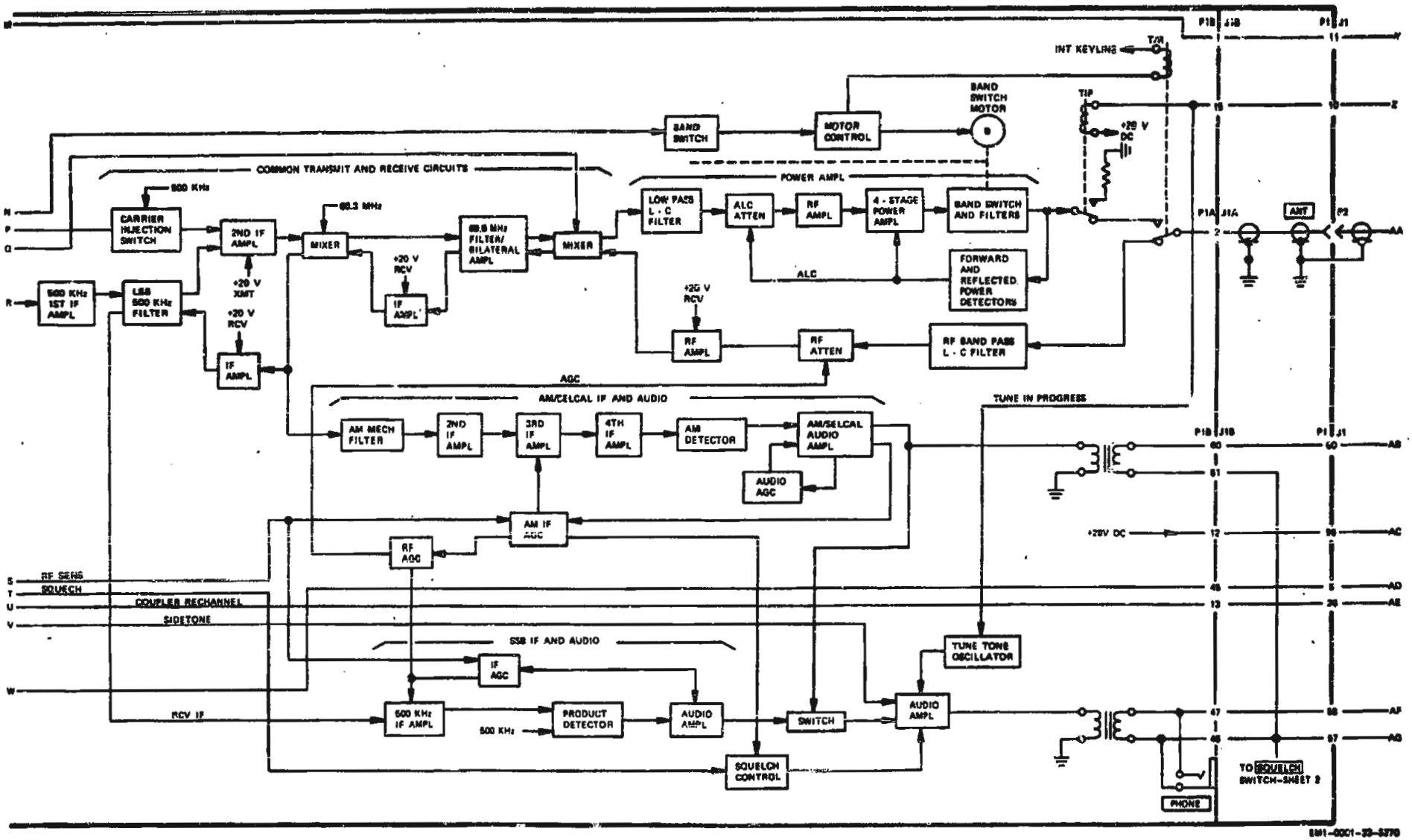
0018



CR HF Communication System No. 1 Schematic
CR SCHEM 1 (Sheet 2)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

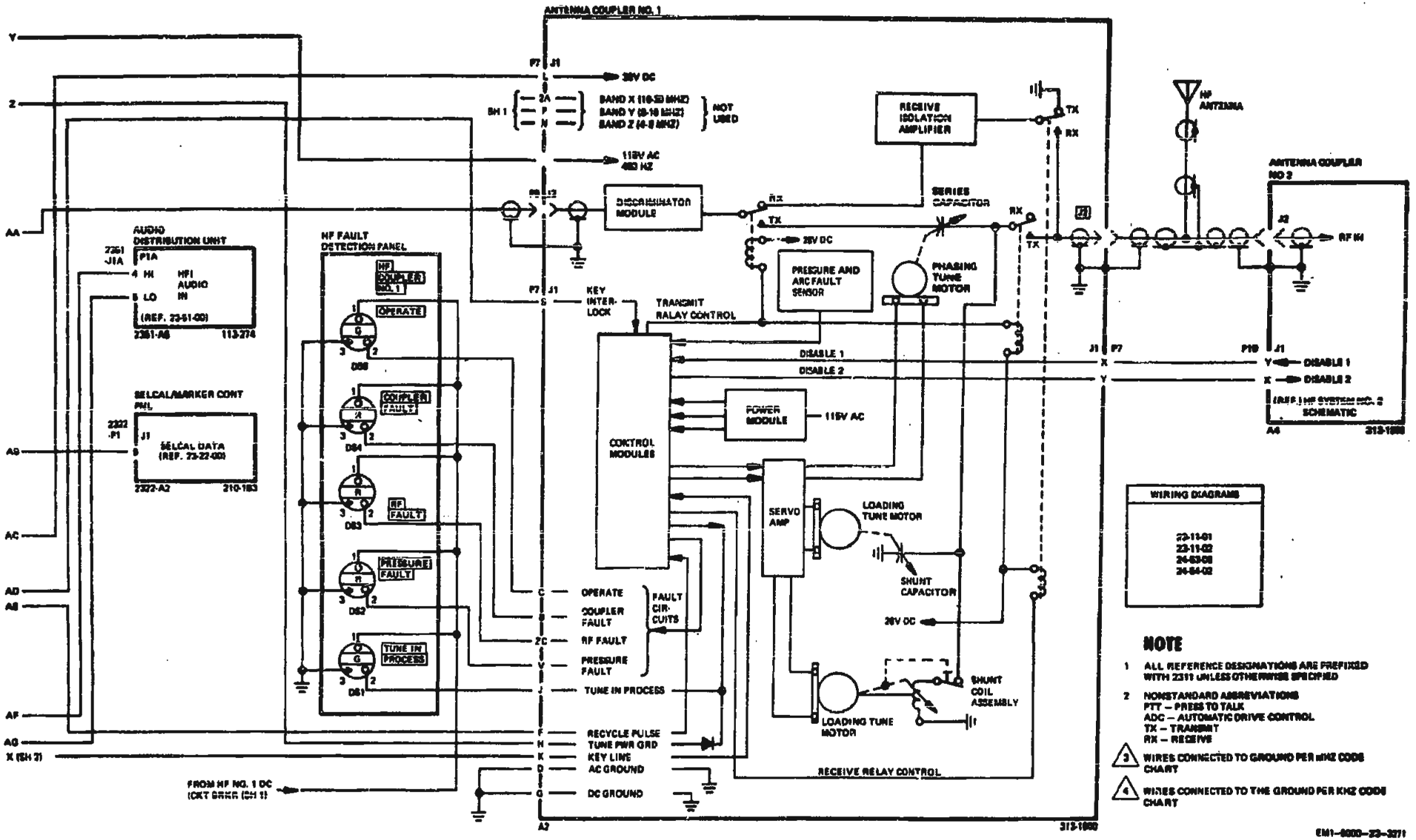
001B



CR HF Communication System No. 1 Schematic
CR SCHEM 1 (Sheet 3)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

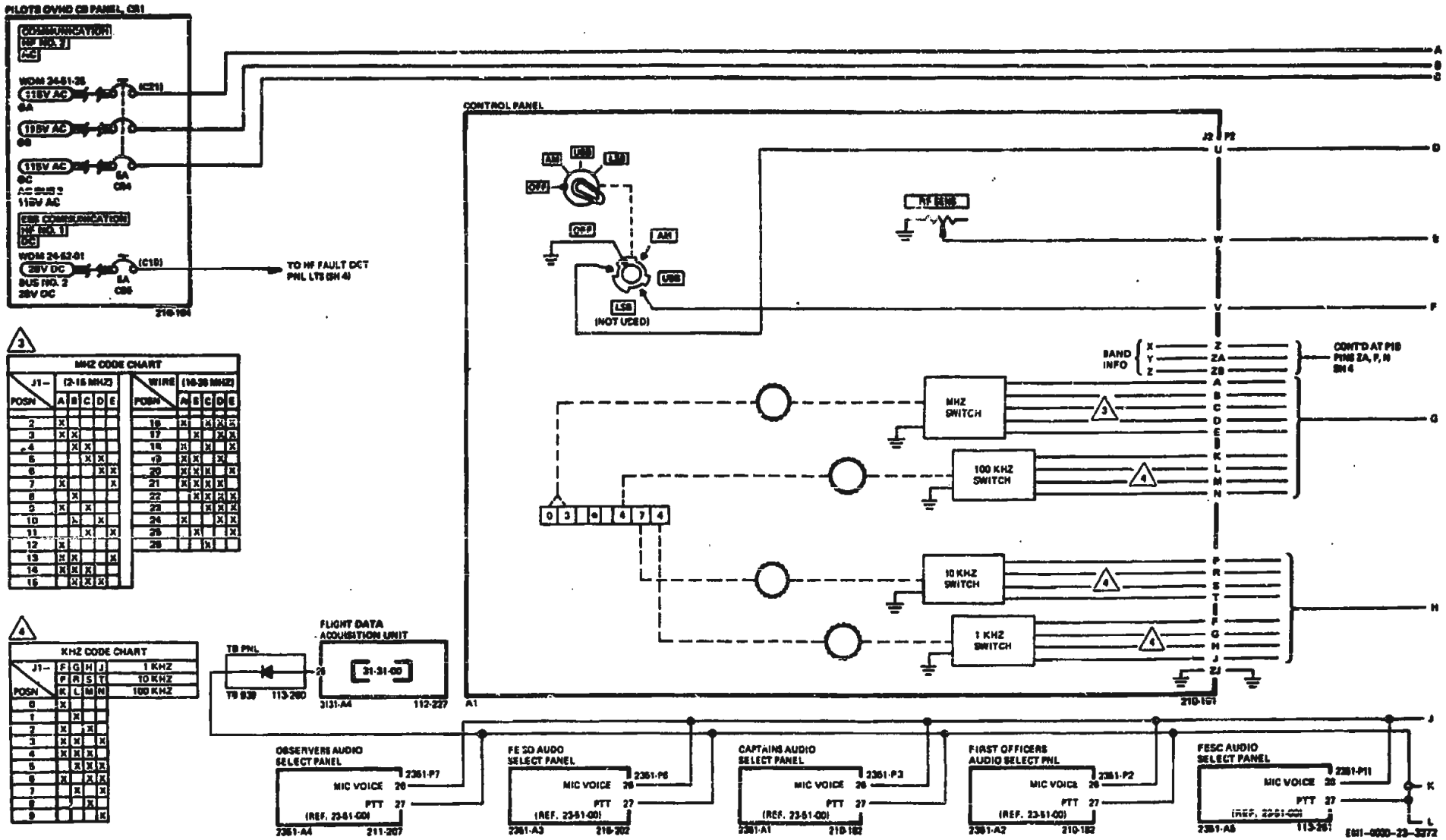
001B



CR HF Communication System No. 1 Schematic
CR SCHEM 1 (Sheet 4)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

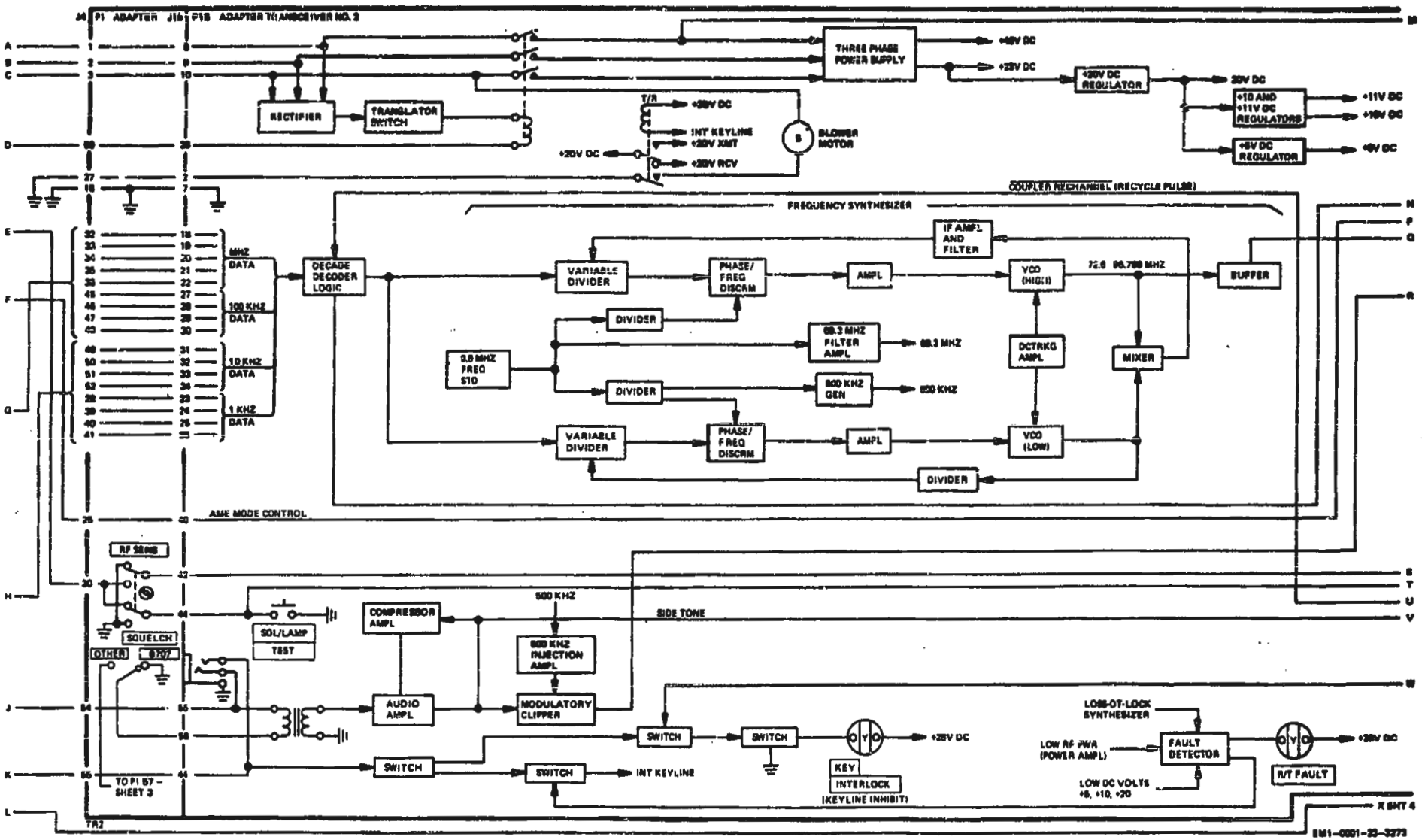
001B



CR HF Communication System No. 2 Schematic
CR SCHEM 2 (Sheet 1)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

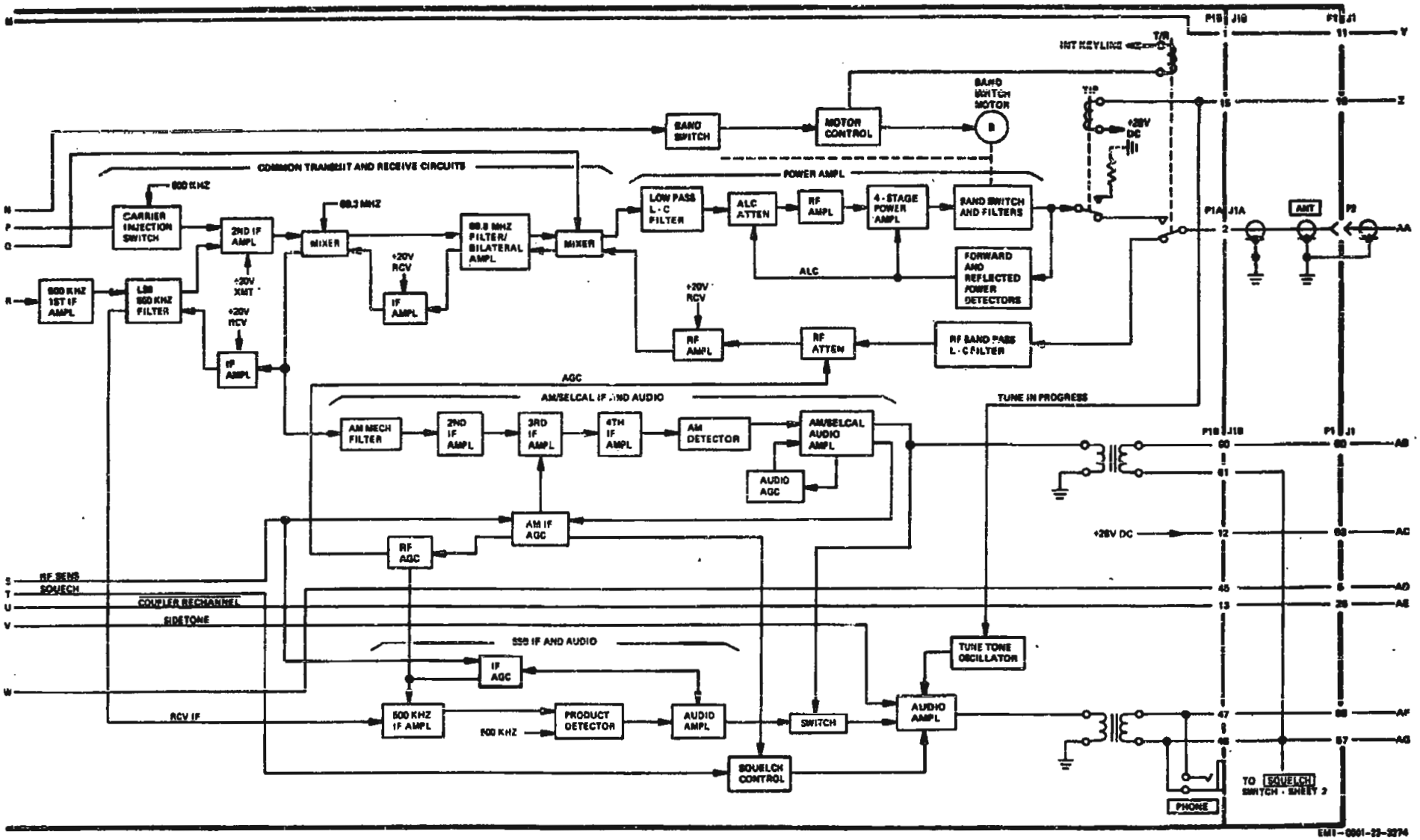
001B



CR HF Communication System No. 2 Schematic
CR SCHEM 2 (Sheet 2)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

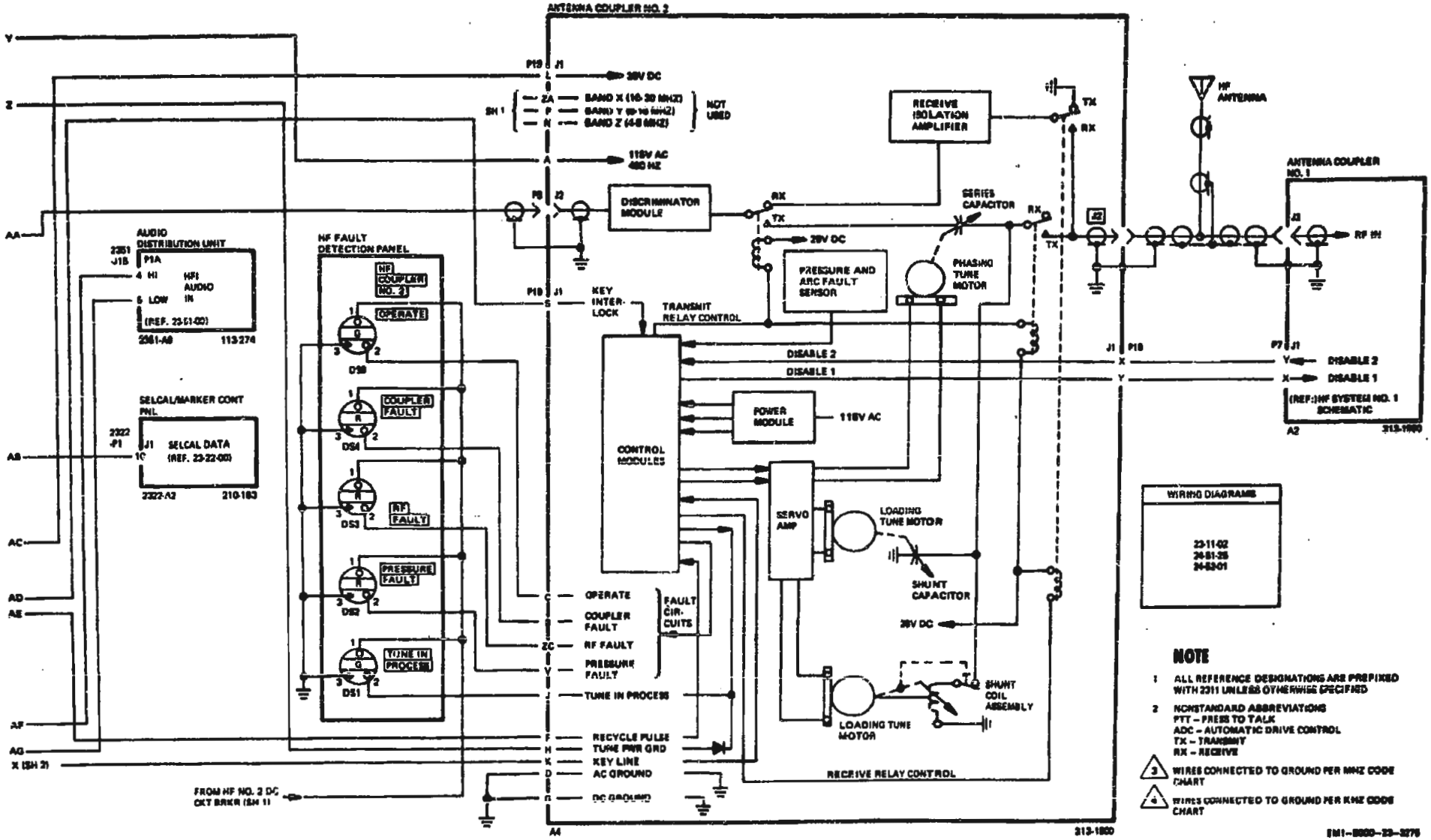
001B



CR HF Communication System No. 2 Schematic
CR SCHEM 2 (Sheet 3)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

001B



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HF Communication System No. 2 Schematic
SCHEM 2 (Sheet 4)

EFFECTIVITY: HF EQUIPPED AIRCRAFT

001B

receiver gain). A good receiver should have ample background noise present when RF SENS is open.

If reception appears faulty, the problem may be caused by the coupler, coaxial cables or the receiver. Connecting a signal generator directly into the receiver and performing a receiver check provides an onboard receiver test. If the receiver checks good, then the coupler could be possible cause, as the coupler contains isolation amplifiers, that when failed cause weak reception. The couplers should also be visually inspected for proper seating in their mount and antenna coaxial connections are tight and not damaged. Correct coupler connections should also be noted, when facing aft coupler No. 1 is on the viewers right (Ref. Fig. 102). If couplers are cross connected, they will fail.

C. Transmit Mode Problems

For transmit problems, note that RF propagation phenomena can influence transmitter performance. Maximum Usable Frequency (MUF) rules for time-of-day, year, etc. should be observed.

WARNING: DO NOT KEY HF TRANSMITTER WHEN ANY FUELING OR DEFUELING OPERATION IS TAKING PLACE WITHIN 100 FEET OF AIRCRAFT.

CAUTION: LISTEN FOR BLOWER MOTOR WHEN TRANSMITTER IS KEYED. IF MOTOR CANNOT BE HEARD WHEN TRANSMITTER IS KEYED, RELEASE PTT SWITCH AND REPLACE TRANSCEIVER BEFORE CONTINUING TEST.

DO NOT TRANSMIT IN USB WHEN ANOTHER AIRCRAFT WITH HF EQUIPMENT IN RECEIVE MODE IS WITHIN 250 FEET.

For transmit problems, first check for proper RF power out at transceiver ANT connection. Disconnect coaxial cable from transceiver ANT connection and connect a wattmeter (Bird 82A or equivalent) with 50-ohm dummy load. With transmitter in AM mode and keyed, a good transmitter should indicate 100 watts or greater output.

If transmitter power out checks good, disconnect wattmeter and dummy load, and reconnect coaxial cable to transceiver ANT connection. Next, gain access to antenna coupler (Ref. Fig. 102), disconnect coaxial cable at coupler and connect coaxial cable to wattmeter with 50-ohm dummy load. With transmitter in AM mode and keyed, check coaxial cable for RF power loss, loss should be about 1 db or less, or RF should be about 80 watts or greater.

If cable checks good, remove dummy load and reconnect wattmeter in-line with coupler. With transmitter in AM mode and keyed, check for high Voltage Standing Wave Ratio (VSWR). Ensure coaxial cables are reconnected after test.

Visually inspect coupler, mount and antenna conductor connections. Ensure coupler is properly seated in its mount and that coupler wiring cables are NOT cross connected, as cross connected cables may cause coupler failure. When facing aft, No. 1 coupler is on viewers right.

Low antenna coupler pressure may cause poor transmitter performance at the higher altitudes, but may perform good on ground tests. Coupler replacement should be considered when transmit problems are reported at high altitudes.

C D. H.F. System Interlock Operation

C (1) Since both H.F. Systems share the same antenna, an
C interlock is provided to "disable" one system when the
C other system is keyed for any reason. Unfortunately,
C this interlock circuit can malfunction without
C exhibiting a COUPLER fault or any other indication that
C the malfunction exists.

C (2) If an H.F. system fails to key and normal
C troubleshooting (including component changes) fails in
C correcting the problem, the H.F. antenna coupler for
C the OPPOSITE system may be faulty. Couplers may be
C interchanged and, if the trouble moves with the
C interchanged coupler, it indicates one coupler has this
C malfunction.

C (3) Additionally, a quick check for this hidden malfunction
C may be made by gaining access to the couplers, removing
C the dust-cap of J3 on the NO. 1 COUPLER'S front panel
C and checking for 28Vdc on pins small g 28V dc and small
C k with both systems powered normally and NOT KEYED. If
C small g reads zero volts, No. 1 coupler is faulty and
C placing a "disable" on the No. 2 coupler; if small k
C reads zero volts, No. 2 coupler is faulty and placing a
C "disable" on the No. 1 coupler. Normally, zero volts
C should appear at small g ONLY when No. 1 system is
C keyed and at small k ONLY when No. 2 system is keyed.
C At all other times, each pin should read 28V dc.

5. Equipment

Signal Generator, HP606AR, or equivalent.

RF Load Meter, Bird 82A or equivalent.

C **HF SYSTEM MAINTENANCE, NOTES, REGULATIONS, TOLERANCES AND DATA**

C 1. **H.F. Communication System Maintenance Checks**

C A. All maintenance or pre-flight "on the air tests" of the H.F. communications system (or systems) must be performed in accordance with the following instructions.

C (1) Effective February 1, 1982, use of single sideband (SSB) (upper sideband) mode of emission became compulsory for all civil aeronautical HF radio communications. Use of AM mode when checking aircraft HF systems is no longer authorized under FCC rules.

C (2) All ground facilities listed transmit and receive in SSB mode for system check using voice.

C (3) Ground station transmission of SELCAL must be made in AM mode (aircraft mode selector need not be in AM position to receive SELCAL check). Since February 1, 1982, only the NYC and SFO ground stations are authorized to and capable of transmitting AM mode HF SELCAL checks. System checks with low power test
CR facilities operating on 5574 KHz at CHI, LAX and STL
C and on 2971 KHz at MCI are limited to voice operations
CR in SSB mode only. SELCAL system checks at CHI, LAX and
CR STL must be accomplished on VHF frequencies.

C (4) Authorized Test Frequencies

C NOTE: Anyone desiring to make an aircraft H.F. system check must first contact the station on VHF or by telephone as designated below.

C NYC Area: The following stations should contact NYC on the VHF frequencies shown:

C JFK 129.9

CR *BOS 129.4

CR *PHL 129.45

CR *IAD 130.42

CR NOTE: *Contact on this frequency is with San
CR Francisco ARINC operator. Request HF check
CR with JFK.

C 5550 KHz

CR 6577 KHz

CR 8846 KHz

CR 11396 KHz

C 13297 KHz

C 17907 KHz

C CR CHI Area: Remotely controlled by SFO: contact SFO on VHF, 131.80 MHz

CR 5574 KHz

C CR LAX Area: Remotely controlled by SFO; contact SFO on VHF, 130.8 MHz to set up voice check.

CR 5574 KHz

CR CR CR MCI Area: Contact MCI Maintenance Supervisor on VHF, 128.9 MHz or by telephone, 891-4772, to set up check.

CR 2971 KHz

CR C SFO Area: Contact SFO on VHF, 131.95 MHz to set up check.

CR 3413 KHz

CR 5547 KHz or 5574 KHz

CR 8849 KHz

CR 13354 KHz

C 17904 KHz

CR CR STL Area: Contact SFO ARINC operator on VHF 131.65 MHz to set up check.

CR 5574 KHz

C C CAUTION: TRANSMISSIONS ON ANY FREQUENCY NOT AUTHORIZED FOR AIRCRAFT USE CAN RESULT IN FCC CITATION.

C B. Every effort should be made to check the HF system operation
C at Domestic origination stations prior to overseas flights.
C If corrections to a malfunction cannot be made prior to
C origination, the Maintenance Coordinator and the gateway
CR station should be notified immediately by longline message
C of corrections required and/or troubleshooting performed.

C C. The authorized test frequencies outlined above will be
C updated when required as a result of changes in frequency
C allocations

C HF COMMUNICATION SYSTEM - ADJUSTMENT AND TEST

C 1. Referenced Procedures

C 23-51-00 Audio Integrating System - Adjustment and Test

C 24-00-00 Electrical Power - Maintenance Practices

C 2. Adjustment/Test

C A. BITE Test

C (1) Turn on electrical power (Ref. 24-00-00).

C (2) On pilots overhead circuit breaker panel CB1, zone 210,
C verify that the following circuit breakers are closed:

C ESS COMMUNICATIONS - HF NO. 1 - DC (C1) and AC (C3)

C COMMUNICATION - HF NO. 2 - DC (C19) and AC (C21)

C CAUTION: IF HF NO. 1 OR NO. 2 TRANSCEIVER BLOWER MOTOR DOES
C NOT OPERATE WHEN HF MODE SELECTOR SWITCH IS
C SELECTED TO AM, OR USB, AND MICROPHONE KEY OR PTT
C SWITCH IS OPERATED, IMMEDIATELY RETURN MODE
C SELECTOR SWITCH TO OFF.

C (3) On pilots aft control console HF dual control panel,
C zone 210, select AM position on both mode selector
C switches.

C Select any authorized test frequency on HF-1 and HF-2
C frequency selector switches.

C (4) In forward electronic service center (FESC) at rear
C rack, zone 113, verify that HF No. 1 and No. 2
C transceiver front panel R/T FAULT and KEY INTERLOCK
C lights are OUT.

CR On HF tranceiver adapter units with OTHER-B747 switch verify
CR that switch is set to OTHER position.

C (5) In forward electronic service center, on HF fault
C detection panel, verify that no red fault lights for HF
C COUPLER NO. 1 and HF COUPLER NO. 2 are on.

C (6) Connect headset at PHONE jack, and microphone at MIC
C jack on transceiver No. 1 front panel.

C Verify that receiver noise is present in headset.

C Press 628T-1 SQL/LAMP TEST pushbutton switch. R/T
C FAULT and KEY INTERLOCK lamps should light.

C WARNING: DO NOT KEY HF TRANSMITTER WHEN ANY FUELING OR
C DEFUELING OPERATION IS TAKING PLACE WITHIN 100
C FEET OF AIRCRAFT.

C CAUTION: 628T-1 BLOWER MOTOR SHOULD OPERATE WHEN KEYING THE
C 628T-1. IF IT DOES NOT, UNKEY IMMEDIATELY AND
C REPAIR OR REPLACE TRANSCEIVER BEFORE CONTINUING
C TEST.

C DO NOT TRANSMIT IN USB MODE WHEN ANOTHER AIRCRAFT
C WITH HF EQUIPMENT IN RECEIVE MODE IS WITHIN 250
C FEET.

C (7) Depress microphone PTT switch.

C Verify that transceiver blower motor operates and 1000
C Hz tone is heard for approximately 5 seconds during
C tuning cycle.

C Verify that green TUNE IN PROCESS light on HF fault
C detection panel comes on, and no red fault lights come
C on.

C At end of tuning cycle, verify that green OPERATE light
C on HF fault detection panel comes on.

C (8) Key 628T-1. KEY INTERLOCK and R/T FAULT lamps should
C remain OFF.

C Release PTT switch.

C (9) Repeat Steps (6) through (8) for transceiver No. 2.

C (10) Turn off HF-1 and HF-2 (mode selector switches OFF).

C Turn off electrical power (Ref. 24-00-00).

C B. Operational Test

C (1) Turn on electrical power (Ref. 24-00-00).

C (2) Verify that audio integrating system (Ref. 23-51-00) is
C on.

C (3) On pilots overhead circuit breaker panel CB1, zone 210,
C verify that the following circuit breakers are closed:

C ESS COMMUNICATIONS - HF NO. 1 - DC (C1) and AC (C3)

C COMMUNICATION - HF NO. 2 - DC (C19) and AC (C21)

C CAUTION: IF HF NO. 1 OR NO. 2 TRANSCEIVER BLOWER MOTOR DOES
C NOT OPERATE WHEN HF MODE SELECTOR SWITCH IS
C SELECTED TO AM OR USB, AND MICROPHONE KEY OR PTT
C SWITCH IS OPERATED, IMMEDIATELY RETURN MODE
C SELECTOR SWITCH TO OFF.

C (4) On pilots aft control console HF dual control panel,
C zone 210, select AM position on both mode selector
C switches.

C In forward electronic service center at rear rack, zone
C 113, verify that HF No. 1 and No. 2 transceiver R/T
C FAULT and KEY INTERLOCK lights are OUT.

C (5) Connect microphone at MIC jack and headset at jack on
C transceiver No. 1 front panel and depress PTT switch,
C then release switch, disconnect microphone, and repeat
C for transceiver No. 2.

C NOTE: Insure frequency is not in use before keying
C MIC.

C When PTT switch is depressed for each transceiver,
C verify that green TUNE IN PROCESS light on HF fault
C detection panel comes on, no red fault lights come on,
C and after approximately 5 seconds TUNE IN PROCESS light
C goes out and green OPERATE light comes on.

C (6) On HF dual control panel on both HF-1 and HF-2
C controls, select frequency of any HF station(s) within
C receiver range, and which transmit in AM or USB modes.

C NOTE: When available, select a station that
C simultaneously transmits AM, USB and LSBWWV may
C be used - select 5.000 MHz, 10.000 MHz, 15.000
C MHz, 20.000 MHz or 25.000 MHz.

C (7) Connect headset and hand-held microphone at any flight
C station crew member position, and depress HF-1 control
C on corresponding audio selector panel. Rotate control
C to approximately mid-range.

C Rotate HF - No. 1 RF SENS control through entire range.

C Verify that signal level varies smoothly and is free of
C control noise.

C Set RF SENS control for comfortable listening level.

(8) Set mode selector switch first to USB then to AM at the time WWV is making a voice transmission, verify that audio quality is comparable in AM and USB.

(9) Release HF-1 control on audio selector panel, depress HF-2 control and set it to mid-range, and then repeat
R Steps (7) and (8) for HF-2.

(10) On control panel set HF No. 2 to each of the following frequencies: 2182.0, 2952.0, 2966.0, 3023.5, 5484.0, 5568.0, 8959.0, 10017.0, and 11367.0 KHz.

At each frequency verify the following:

Receiver is muted for approximately 10 seconds while tuning to each frequency.

Receiver noise is present on each frequency after tuning is completed.

(11) Release HF-2 control on audio selector panel, depress HF-1 control, and then repeat Step (10) for HF No. 1.

WARNING: DO NOT KEY HF TRANSMITTER WHEN ANY FUELING OR DEFUELING OPERATION IS TAKING PLACE WITHIN 100 FEET OF AIRCRAFT.

CAUTION: 628T-1 BLOWER MOTOR SHOULD OPERATE WHEN KEYING THE 628T-1.IF IT DOES NOT, UNKEY IMMEDIATELY AND REPAIR OR REPLACE TRANSCEIVER BEFORE CONTINUING TEST.

IF MOTOR CANNOT BE HEARD WHEN TRANSMITTER IS KEYED, RELEASE PTT SWITCH AND REPAIR OR REPLACE TRANSCEIVER BEFORE CONTINUING TEST.

DO NOT TRANSMIT IN USB MODE WHEN ANOTHER AIRCRAFT WITH HF EQUIPMENT IN RECEIVE MODE IS WITHIN 250
CR FEET. ALWAYS ENSURE FREQUENCY IS NOT IN USE
CR BEFORE TRANSMITTING.

(12) On audio selector panel, depress MIC SEL HF-1.

On control panel set HF No. 1 to each of the following frequencies: 2952.0, 5484.0, 8959.0, 11367.0, and 6540.0 KHz.

At each frequency, momentarily depress hand-held microphone PTT switch. Verify the following:

When each frequency is selected, receiver mutes, tunes, and then receiver noise returns.

When PTT switch is momentarily depressed, 1000 Hz tone is heard for approximately 5 seconds during tuning cycle.

Release PTT switch before changing selected frequency.

(13) Select any authorized test frequency. Key transmitter and request radio check. Verify the following:

Sidetone is loud and clear during transmission.

Test station is received loud and clear.

Test station reports transmission received loud and clear.

Repeat test in USB mode.

(14) On audio selector panel, release HF-1 control, and depress HF-2 and MIC SEL HF-2 controls.

Repeat Steps (12) and (13) for HF-2.

(15) Turn off HF communication system (mode selector switches OFF).

Turn off electrical power (Ref. 24-00-00).

C HF CONTROL PANEL - REMOVAL AND INSTALLATION

C 1. Referenced Procedure

C 23-11-00 HF Communication System - Adjustment and Test

C 24-00-00 Electrical Power - Maintenance Practices

C 2. Removal/Installation

C A. Removal

C (1) On pilots overhead circuit breaker panel CB1, zone 210, C open and tag circuit breakers ESS COMMUNICATIONS - HF C NO. 1 - DC (C1) and AC (C3), and COMMUNICATION - HF NO. C 2 - DC (C19) and AC (C21).

C (2) Release mounting fasteners of control panel on pilot's C center console.

C (3) Lift control panel from pilot's center console mount C and disconnect connectors from J1 and J2.

C B. Installation

C (1) Verify that circuit breakers opened in Step 2A(1) are C open and tagged.

C (2) Position HF control panel at pilot's center console and C connect J1 and J2.

C (3) Place control panel into position and press firmly C while securing fasteners.

C (4) Remove tags and close circuit breakers opened in Step C 2A(1).

CR (5) Perform operational test of HF Communication System CR Corresponding to panel which was replaced (Ref. C 23-11-00).

HF ANTENNA - REMOVAL AND INSTALLATION

1. Equipment and Materials

Soft clean rags

Abrasive Cloth or Paper

Plastic scraper

Stainless or Aluminum Bonding Brush

Solvent, Methyl-Ethyl-Ketone (MEK), Federal Specification TT-M-261, or equivalent

Solvent, Trichloroethane, Federal Specification O-T-620 1,1,1, or equivalent

C Aerodynamic sealant, (LAC Spec C-40-1279, Mfr P/N PR1436G-B2,
C TWA Stk Nbr 50-1188)

Compound, Sealing, Integral, Fuel Tanks LCM 40-2180 or equivalent.

R Milliohmmeter, or equivalent.

2. Referenced Procedures

	20-51-03	Anti-Chafing Protection of Structure Contacting External Doors and Fillets - Maintenance Practices
	20-51-04	Environmental Sealing of Model L-1011 Airplane - Maintenance Practices
	23-11-00	HF Communication System - Adjustment and Test
R	23-11-04	Antenna Coupler - Removal and Installation

3. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESS COMMUNICATIONS - HF NO. 1 - DC (C1) and AC (C3), and COMMUNICATION - HF NO. 2 - DC (C19) and AC (C21).

(2) At right side of afterbody dorsal saddle near vertical stabilizer leading edge, remove screws from access door 313FR, and remove door (Ref. Fig. 401).

(3) Inside afterbody above catwalk on bottom of antenna cavity, remove oval access plate. In antenna cavity, remove nut, bolt, and washer securing electrical straps
R to HF antenna conductor.

NOTE: HF antenna (Ref. Fig. 401) is bonded to a fiberglass saddle. The saddle forms part of the airframe structure when installed.

(4) In area just forward of leading edge of vertical stabilizer, remove bolts securing HF antenna saddle to aircraft structure. Break sealant bead around edge of antenna saddle structure and remove.

WARNING: USE METHYL-ETHYL-KETONE (MEK) IN WELL-VENTILATED AREA. AVOID FLUID CONTACT WITH SKIN AND EYES. PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE IRRITATION.

KEEP MEK AWAY FROM HEAT, SPARKS AND OPEN FLAME. FAILURE TO COMPLY MAY RESULT IN MATERIAL COMBUSTION.

(5) Use plastic scraper to remove sealant from aircraft structure, antenna saddle, and access door. Use soft clean rag saturated with MEK to wipe surfaces clean. Do not allow MEK to air-dry on surfaces; wipe dry with soft clean dry rag.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

WARNING: USE TRICHLOROETHANE IN WELL-VENTILATED AREA. DO NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH SKIN. PROLONGED EXPOSURE MAY RESULT IN UNCONSCIOUSNESS OR LUNG OR SKIN IRRITATION.

Using soft clean rag saturated with trichloroethane solvent. Do not allow solvent to air-dry; wipe dry with soft clean dry rag. Upper end of HF antenna and mating airframe surface must be absolutely clean for continuity.

(2) Clean all faying surfaces of aircraft structure, access door, and antenna saddle.

(a) Cleaning/Bonding Procedure:

R • Clean all faying surfaces on the feed straps and upper end of antenna where it mates with aircraft structure with an abrasive cloth, abrasive paper, or plastic scraper. The cleaned feed strap area should extend at least 1/2-inch beyond the area covered by the installation hardware (nut, bolt, washer) reference Figure 401.

• Clean the bonding area on the HF antenna tube conductor with an abrasive cloth, abrasive paper, or plastic scraper.

• Clean the connecting hardware (bolt(1), washers(3), nuts(3)) with a stiff non-metallic brush and plastic scraper.

R WARNING: USE TRICHLOROETHANE IN WELL-VENTILATED AREA. DO NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH SKIN. PROLONGED EXPOSURE MAY RESULT IN UNCONSCIOUSNESS OR LUNG OR SKIN IRRITATION.

R • Dampen a clean paper towel or cloth with 1,1,1 trichloroethane and thoroughly clean the faying surfaces on the HF antenna feed straps, antenna tube conductor, and upper end of antenna/aircraft structure. Before solvent evaporation, wipe all surfaces dry with a clean paper towel.

CAUTION: DO NOT APPLY ANTI-CHAFING COMPOUND ON AIRFRAME AREA THAT MATES WITH HF ANTENNA (REF. FIG. 401).

(3) Coat edge of airframe mating surface where HF antenna saddle structure bolts with anti-chafing compound (Ref. 20-51-03). Do not apply anti-chafing compound to airframe area that mates with upper end of HF antenna.

(4) Verify that upper HF antenna and airframe mating surface are absolutely clean.

(5) Place antenna saddle in mounting position. Secure antenna saddle to aircraft structure with bolts.

(6) Reconnect the HF antenna feed straps to HF coupler mounts and HF antenna tube conductor, reference Figure 401, and 23-11-04.

R (7) Remove both HF couplers per MM 23-11-04.

R (8) Using a milliohmmeter, measure the resistance between the center connector and aligning ring on each HF Coupler Mount. The resistance should not exceed 0.0025 ohms.

R NOTE: A reading exceeding 0.0025 ohms requires another
R cleaning and rebonding per Step 3B(2)(a).

R (9) Reinstall both HF couplers per MM 23-11-04.

R (10) Install oval access door.

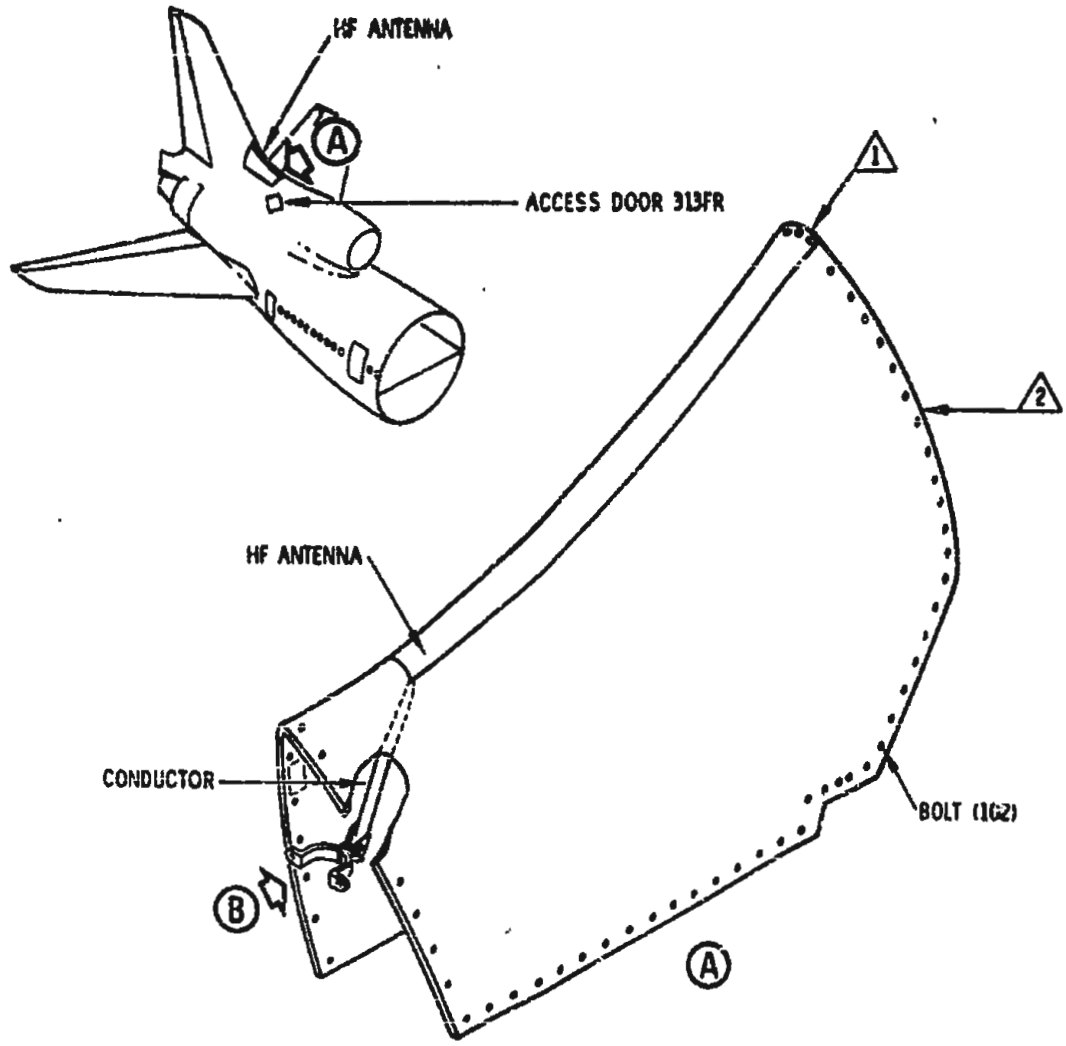
R (11) Close circuit breakers opened in Step 3A(1).

R (12) Perform operational test of HF communication system (Ref. 23-11-00).

WARNING: DO NOT ALLOW SEALANT TO CONTACT SKIN OR EYES. PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE IRRITATION.

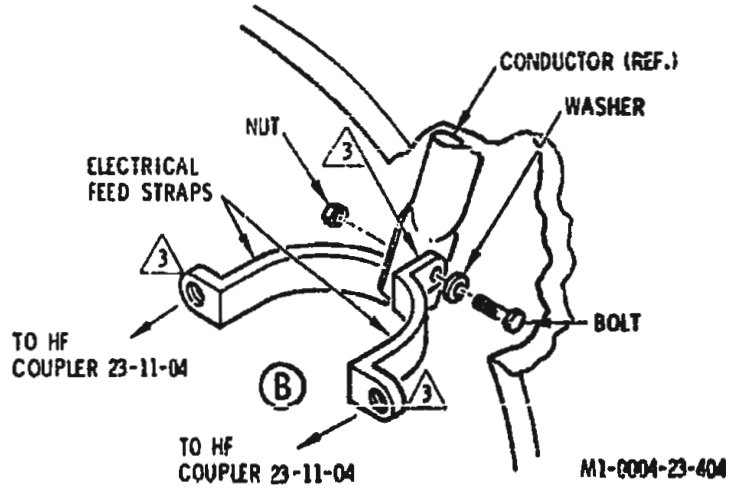
R (13) Apply a bead of aerodynamic sealant to entire joint between antenna saddle and aircraft structure including area where upper end of HF antenna mates with airframe structure. This forms an environmental seal and will not interfere with antenna continuity to airframe (Ref. 20-51-04).

R (14) Hold access door 313FR in place and secure with screws. Apply a bead of aerodynamic sealant to entire joint between door and aircraft structure.



NOTE

1. UNDERSIDE OF HF ANTENNA AND MATING AIRFRAME SURFACE IN THIS AREA MUST BE ABSOLUTELY CLEAN FOR CONTINUITY.
2. HF ANTENNA IS BONDED TO THIS FIBERGLASS SADDLE WHICH FORMS PART OF AIRFRAME STRUCTURE WHEN INSTALLED.
3. TAKE RESISTANCE READINGS AT THESE AREAS.



R HF Antenna - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

C # HF TRANSCEIVER - REMOVAL AND INSTALLATION

C 1. Referenced Procedure

C 23-11-00 HF Communication System - Adjustment and Test

C 2. Removal/Installation

C A. Removal

C (1) On pilots overhead circuit breaker panel CB1, zone 210, C open and tag circuit breakers ESS COMMUNICATIONS - HF C No. 1 - DC (C1) and AC (C3) for transceiver No. 1, or C COMMUNICATION - HF No. 2 - DC (C19) and AC (C21) for C transceiver No. 2.

C (2) In forward electronic service center at rear rack, zone C 113, disconnect antenna cable from connector on front C panel of transceiver adapter tray (Ref. Fig. 401). C Loosen two knurled thumbscrews and disengage from C mounting brackets on front of transceiver adapter (Ref. C Fig. 401).

CR (3) Pull transceiver adapter tray forward until connectors CR and guide pins at rear of tray disengage, then remove CR transceiver and adapter as an assembly.

C B. Installation

C (1) Verify that circuit breakers opened in Step 2A(1) are C open and tagged.

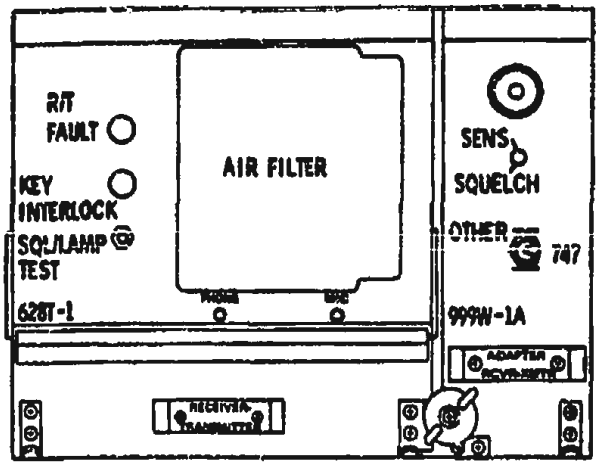
CR (2) Place Transceiver and adapter in rack (Ref. Fig. 401) C and slide to rear until guide pins and connectors mate C firmly, then secure with knurled thumbscrews.

C (3) Connect antenna cable to coaxial plug on right side of C transceiver adapter and hand tighten.

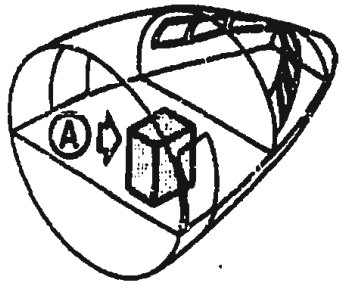
C (4) Assure switch on front of L shaped adapter 999W-1A is C in OTHER position.

C (5) Remove tags and close circuit breakers opened in Step C 2A(1).

C (6) Perform operational test of HF transceiver which was C replaced (Ref. 23-11-00).

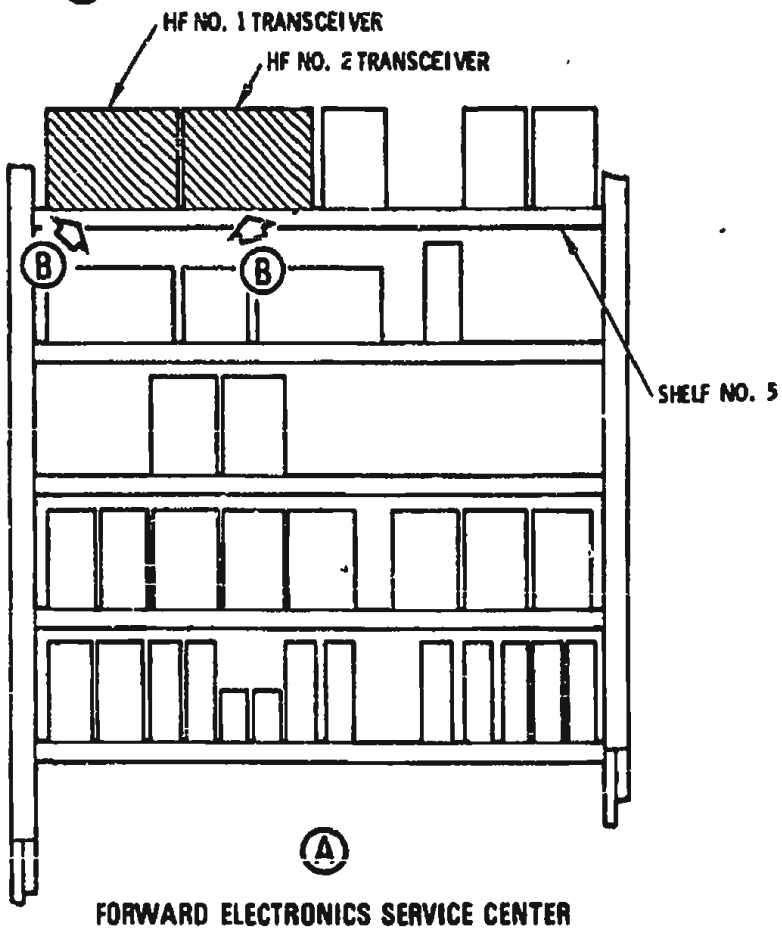


628T INSTALLED IN 999W-1A ADAPTER



ZONE 113

B



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK

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C HF Transceiver - Removal and Installation
C Figure 401

CR

HF TRANSCEIVER - CLEANING/PAINTING

CR 1. HF Transceiver Cleaning

CR A. General

CR (1) The following paragraphs provide a cleaning procedure for the mesh air cleaner mounted on the front of the transceiver.

CR NOTE: Procedures are established to clean the filter at scheduled intervals. However, should the filter require cleaning between these intervals, the following procedure should be used:

CR B. Equipment and Materials.

CR (1) Solution of cool water and mild dishwashing detergent.

CR (2) Source of dry compressed air or nitrogen.

CR (3) Clean soft cloth

CR C. Prepare for Cleaning

CR (1) Grasp filter with fingers and remove filter from framework.

CR D. Clean Filter

CR (1) Slowly immerse filter, dirty side up, in detergent solution. Swish filter up and down beneath surface to dislodge dirt particles.

CR (2) Remove filter, taking care not to retrap dirt.

CR (3) Repeat Step (1) using clean solution, if necessary.

CR (4) Shake filter and dry thoroughly with a mild blast of air or nitrogen.

CR (5) Insert filter into transceiver bracket.

C HF ANTENNA COUPLER - REMOVAL AND INSTALLATION

C 1. Equipment and Materials

C Soft clean rags

C Plastic scraper

C Solvent, Methyl-Ethyl-Ketone (MEK), Federal Specification
C TT-M-261, or equivalent

C Solvent, Trichloroethane, Federal Specification O-T-620 1,1,1,
C or equivalent

C Aerodynamic sealant, LAC Spec C-40-1279, or equivalent

C 2. Referenced Procedures

C 23-11-00 HF Communication System - Adjustment and Test

C 51-25-00 L-1011 Structural Repair Manual - Structural
C Sealing

C 3. Removal/Installation

C NOTE: If a coupler has very little physical resistance during
C removal or insertion, VERY GENTLY spread the bulb-shaped
C split contact that plugs into the coupler by using a
C knife blade or other gently tapered tool.

C A. Removal

C (1) On pilots overhead circuit breaker panel CB1, zone 210,
C open and tag circuit breakers ESS COMMUNICATIONS - HF
C NO. 1 - DC (C1) and AC (C3), and COMMUNICATION - HF NO.
C 2 - DC (C19) and AC (C21).

C (2) At right side of afterbody dorsal saddle near vertical
C stabilizer leading edge, remove screws from access door
C 313FR, and remove door (Ref. Fig. 401). Remove "X"
C shaped cover (313KZ) from tuner access opening by
C loosening five captive screws.

C (3) On antenna coupler front panel, remove cable connector
C from J1 and coaxial cable from J2. Loosen knurled
C thumbscrews and disengage from mounting brackets at
C front of antenna coupler.

C NOTE: If both antenna couplers are to be removed, tag
C J1 and J2 for coupler No. 1 and No. 2 to prevent
C cross-connecting when couplers are reinstalled.

C (4) Pull antenna coupler forward until connector and
C aligning ring are disengaged, then remove antenna
C coupler.

C WARNING: USE METHYL-ETHYL-KETONE (MEK) IN WELL-VENTILATED
C AREA. AVOID FLUID CONTACT WITH SKIN AND EYES.
C PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE
C IRRITATION.

C KEEP MEK AWAY FROM HEAT, SPARKS AND OPEN FLAME.
C FAILURE TO COMPLY MAY RESULT IN MATERIAL
C COMBUSTION.

C (5) Use plastic scraper to remove sealant from aircraft
C structure and access door. Use soft clean rag
C saturated with MEK to wipe surfaces clean. Do not
C allow MEK to air-dry on surfaces; wipe dry with soft
C clean dry rag.

C B. Installation

C WARNING: USE TRICHLOROETHANE IN WELL-VENTILATED AREA. DO
C NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH
C SKIN. PROLONGED EXPOSURE MAY RESULT IN
C UNCONSCIOUSNESS OR LUNG OR SKIN IRRITATION.

C (1) Clean all faying surfaces of aircraft structure and
C access door 313FR, and T-shaped bracket and mounting
C points for electrical bond, using soft clean rag
C saturated with trichloroethane solvent. Do not allow
C solvent to air-dry; wipe dry with soft clean dry rag.

C (2) Verify that circuit breakers opened in Step 3A(1) are
C open and tagged.

C (3) Slide antenna coupler into mount until connector and
C aligning ring are engaged and seated. Secure with
C knurled thumbscrews (Ref. Fig. 401).

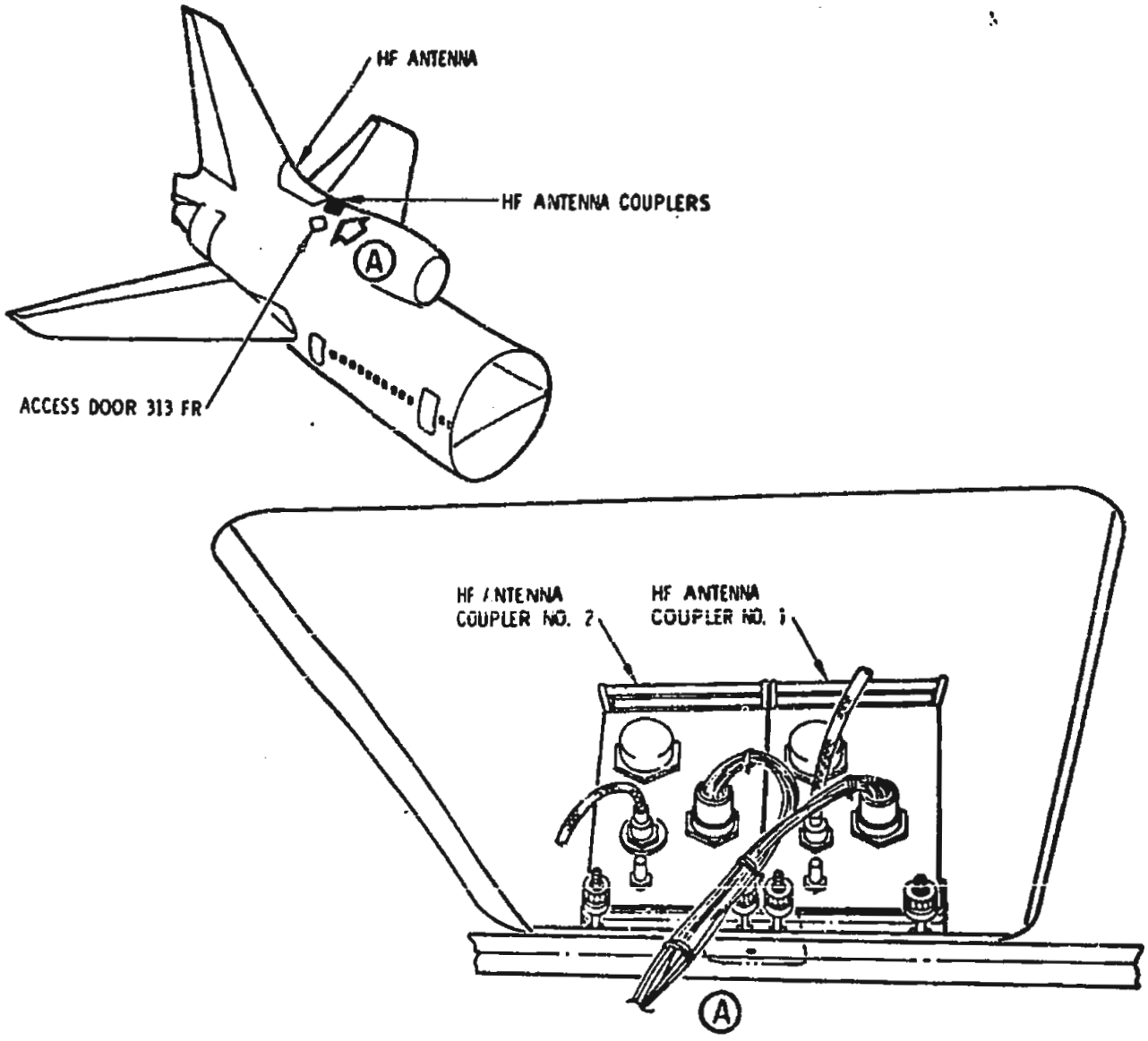
C (4) On antenna coupler front panel, connect cable connector
C to J1 and coaxial cable to J2. Install "X" shaped
C cover (313KZ) over tuner access opening by loosening
C five captive screws.

C NOTE: Verify that J1 and J2 are not cross-connected
C between coupler No. 1 and No. 2.

C (5) Remove tags and close circuit breakers opened in Step
CR 3A(1). Perform operational test of HF system for which
C coupler was replaced (Ref. 23-11-00).

C WARNING: DO NOT ALLOW SEALANT TO CONTACT SKIN OR EYES.
C PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE
C IRRITATION.

C (6) Hold access door 313FR in place and secure with screws.
C Apply bead of aerodynamic sealant to joint between door
C and aircraft structure (Ref. 51-25-00, L-1011
C Structural Repair Manual).



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C
C

Antenna Coupler - Removal and Installation
Figure 401

EFFECTIVITY: HF EQUIPPED AIRCRAFT

C COUPLER MOUNT - REMOVAL AND INSTALLATION

C 1. Equipment and Materials

C Soft clean rags

C Plastic scraper

C Solvent, Methyl-Ethyl-Ketone (MEK), Federal Specification
C TT-M-261, or equivalent

C Solvent, Trichloroethane, Federal Specification O-T-620 1,1,1,
C or equivalent

C Aerodynamic sealant, LAC Spec C-40-1279, or equivalent

C 2. Referenced Procedures

C 23-11-00 HF Communication System - Adjustment and Test

C 23-11-04 HF Antenna Coupler - Removal and Installation

C 51-25-00 L-1011 Structural Repair Manual - Structural
C Sealing

C 3. Removal/Installation

C NOTE: While in area, visually check the aluminum lead-in tube
C for cracks at the flattened area. If cracked, change the
C antenna assembly or set up to be changed as soon as
C possible.

C A. Removal

C (1) On pilots overhead circuit breaker panel CB1, zone 210,
C open and tag circuit breakers ESS COMMUNICATIONS - HF
C NO. 1 - DC (C1) and AC (C3), and COMMUNICATION - HF NO.
C 2 - DC (C19) and AC (C21).

C (2) At right side of afterbody dorsal saddle near vertical
C stabilizer leading edge, remove screws from access door
C 313FR, and remove door (Ref. Fig. 401).

C (3) Remove antenna couplers from mount (Ref. 23-11-04).

C (4) Remove oval access plate from bottom of HF antenna
C cavity (aft of antenna coupler access opening). Inside

C antenna cavity, remove 10-32 nuts securing electrical
C straps to aft end of coupler mount.

CR CAUTION: THERE MAY BE SEALANT BETWEEN THE COUPLER MOUNT AND
CR AIRCRAFT STRUCTURE. IF SO, IT MUST BE CLEANED OFF
CR BEFORE REMOVING THE COUPLER MOUNT.

C (5) Remove nuts, bolts, and washers securing aft end of
C mount to aircraft structure. Remove bolts and washers
C securing bottom of mount to aircraft structure, then
C remove coupler mount.

C WARNING: USE METHYL-ETHYL-KETONE (MEK) IN WELL-VENTILATED
C AREA. AVOID FLUID CONTACT WITH SKIN AND EYES.
C PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE
C IRRITATION.

C KEEP MEK AWAY FROM HEAT, SPARKS AND OPEN FLAME.
C FAILURE TO COMPLY MAY RESULT IN MATERIAL
C COMBUSTION.

C (6) Use plastic scraper to remove sealant from aircraft
C structure and access door. Use soft clean rag
C saturated with MEK to wipe surfaces clean. Do not
C allow MEK to air-dry on surfaces; wipe dry with soft
C clean dry rag.

C B. Installation

C WARNING: USE TRICHLOROETHANE IN WELL-VENTILATED AREA. DO
C NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH
C SKIN. PROLONGED EXPOSURE MAY RESULT IN
C UNCONSCIOUSNESS OR LUNG OR SKIN IRRITATION.

C (1) Clean all faying surfaces of aircraft structure and
C access door 313FR, antenna cavity access plate, and
C attach points for electrical bond, using soft clean rag
C saturated with trichloroethane solvent. Do not allow
C solvent to air-dry; wipe dry with soft clean dry rag.

C (2) Verify that circuit breakers opened in Step 3A(1) are
C open and tagged.

C (3) Place coupler mount in position and secure bottom of
C mount to aircraft structure with mounting washers and
C bolts (Ref. Fig. 401).

C (4) Secure aft end of mount to aircraft structure with
C mounting bolts, washers, and nuts.

C (5) In HF antenna cavity, secure electrical straps to aft
C end of mount with 10-32 nuts. Replace oval access
C plate on bottom of antenna cavity.

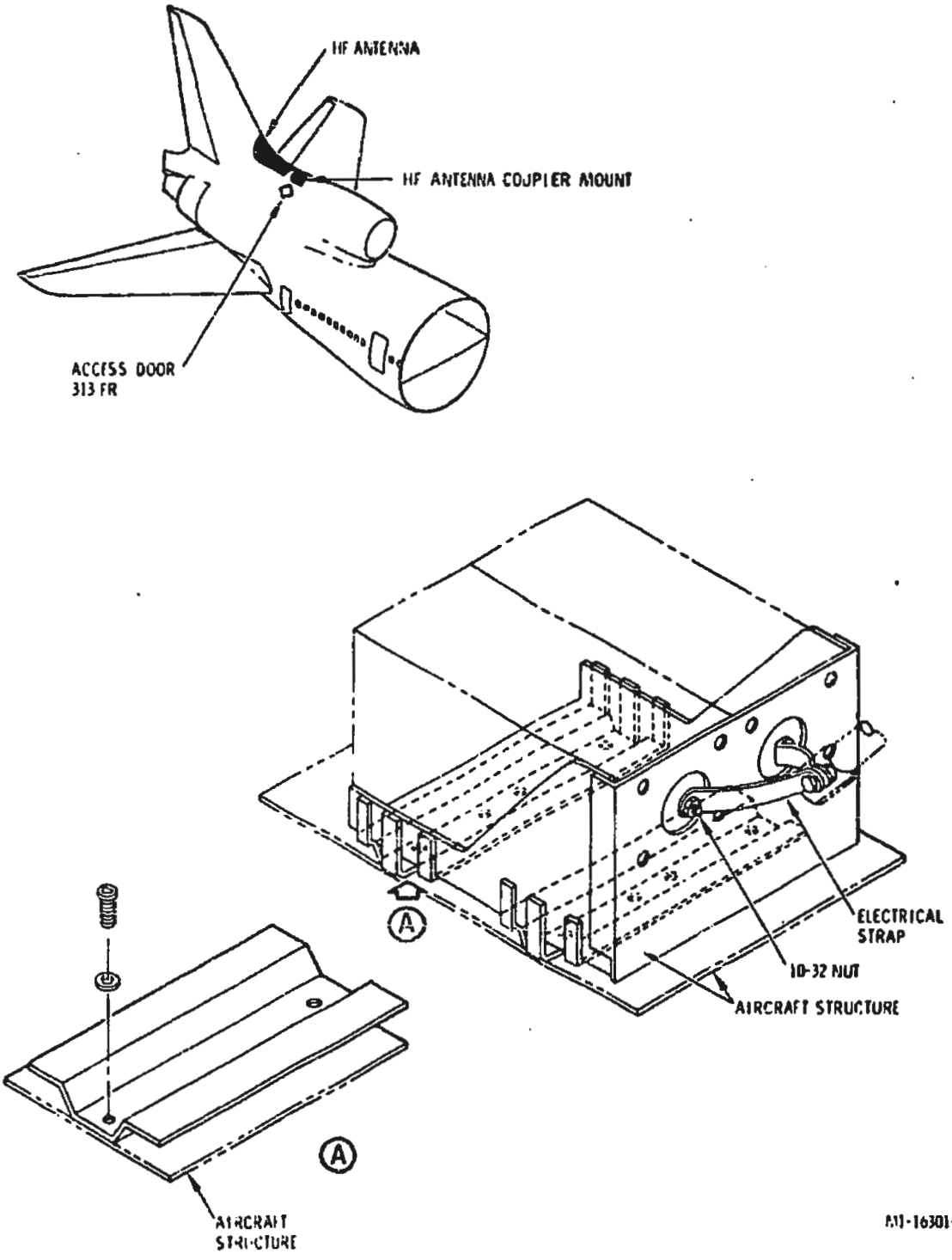
C (6) Install antenna couplers (Ref. 23-11-04).

C (7) Remove tags and close circuit breakers opened in
C 3A(1).

C (8) Perform HF communication system operational test (Ref.
C 23-11-00).

C WARNING: DO NOT ALLOW SEALANT TO CONTACT SKIN OR EYES.
C PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE
C IRRITATION.

C (9) Hold access door 313FR in place and secure with screws.
C Apply bead of aerodynamic sealant to joint between door
C and aircraft structure (Ref. 51-25-00, L-1011
C Structural Repair Manual.



C Coupler Mount - Removal and Installation
C Figure 401

VERY HIGH AND ULTRA HIGH FREQUENCY (VHF/UHF) DESCRIPTION AND OPERATION

1. General

The VHF/UHF communication system consists of a selective calling (SELCAL) system and a VHF communication system.

TheSELCAL system includes a dual SELCAL decoder and a control panel. The system (Ref. 23-22-00) alerts the flight crew with an amber light and a chime signal whenever a coded communication
R is received on a selected frequency on one of the VHF or HF (HF equipped aircraft) systems.

The VHF communication system includes three transceivers, three control panels, and three antennas. The system (Ref. 23-23-00) provides line-of-sight voice communications capability.

SELCAL (SELECTIVE CALLING) SYSTEM - DESCRIPTION AND OPERATION

1. General

CR The SELCAL system provides a dual capability for monitoring selected HF (HF equipped aircraft) and VHF communications frequencies. The system (Ref. Fig. 1) includes a dual decoder and a dual control panel. The decoder is installed in the forward electronic service center rear rack shelf No. 4, zone 113. The control panel is located in the pilots center console, zone 210.

C One 4-letter SELCAL code can be assigned to an aircraft. A 4-letter code can be any combination of the 12 letters from A through M (except I). Each code letter corresponds to an audio tone (Ref. Table 1). The codes are selected on the front panel
C of the dual decoder.

Each SELCAL channel provides a steady or pulsed 28V dc output to the control panel SELCAL light and to the flight station chime speaker (Ref. 23-41-00) to notify the flight crew of an incoming SELCAL HF or VHF ground station message.

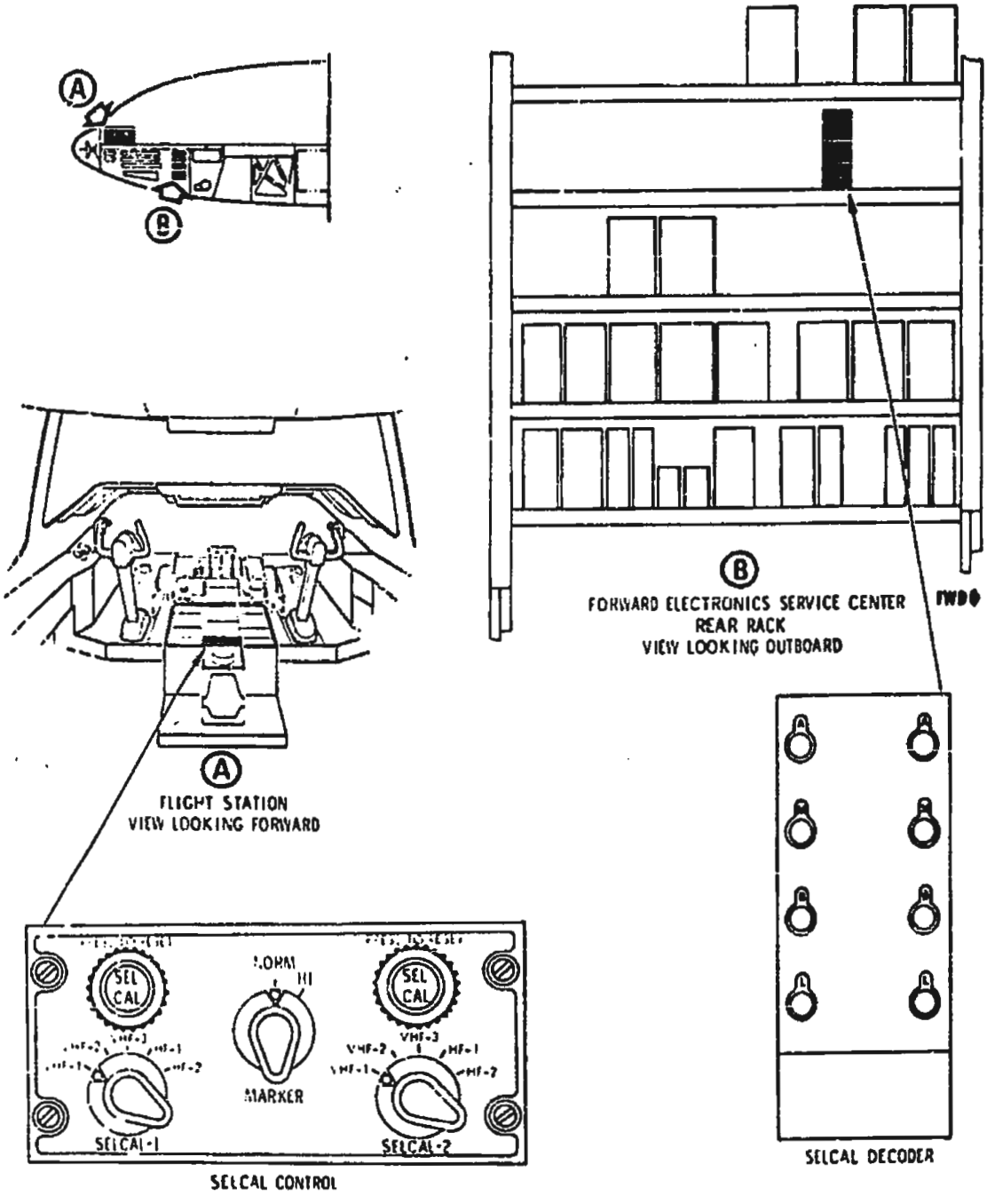
The pulsed 28V dc output is connected to the flight station chime speaker to provide a repeating (HI) chime tone (1 second intervals), and the steady 28V dc output is connected to the control panel SELCAL light. The repeating (HI) chime tone and steady light provides notification to the flight crew of an incoming SELCAL call.

Code Letter Audio Tone Frequencies
Table 1

CODE LETTER	TONE FREQUENCY	CODE LETTER	TONE FREQUENCY
A	312.6	G	582.1
B	346.7	H	645.7
C	384.6	J	716.1
D	426.6	K	794.3
E	473.2	L	881.0
F	524.8	M	977.2

2. Operation

Power for the decoder and control panel (Ref. Fig. 2) is supplied from the 28V dc essential communications bus through



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R SELCAL System Equipment and Location
R Figure 1

circuit breaker ESS COMMUNICATIONS - SELCAL (C5) on the pilots overhead circuit breaker panel CB1, zone 210.

C To call an aircraft, the 4-letter SELCAL code assigned to the
C aircraft is transmitted on an HF frequency (HF equipped
C aircraft) or VHF frequency.

C When an HF frequency (HF equipped aircraft) or VHF transceiver in the aircraft is tuned to the calling frequency, the coded signal is received and detected, and the detected audio is
C supplied to the SELCAL control panel. The system which received the signal is selected on the control panel for SELCAL -1 or SELCAL -2, connecting the coded audio signal to the corresponding decoder channel.

When the coded audio signal matches the 4-letter code selected for the decoder channel, relays in the decoder latch to provide a steady 28V dc output, and a pulsed 28V dc output. The 28V dc output (steady or pulsed) is connected to the control panel SELCAL light and flight station speaker (Ref. paragraph 1).

Depressing the PRESS TO RESET - SELCAL light on the control panel connects a ground to the decoder to unlatch the relays, which turns the control panel light off and silences the chime.

3. Decoder

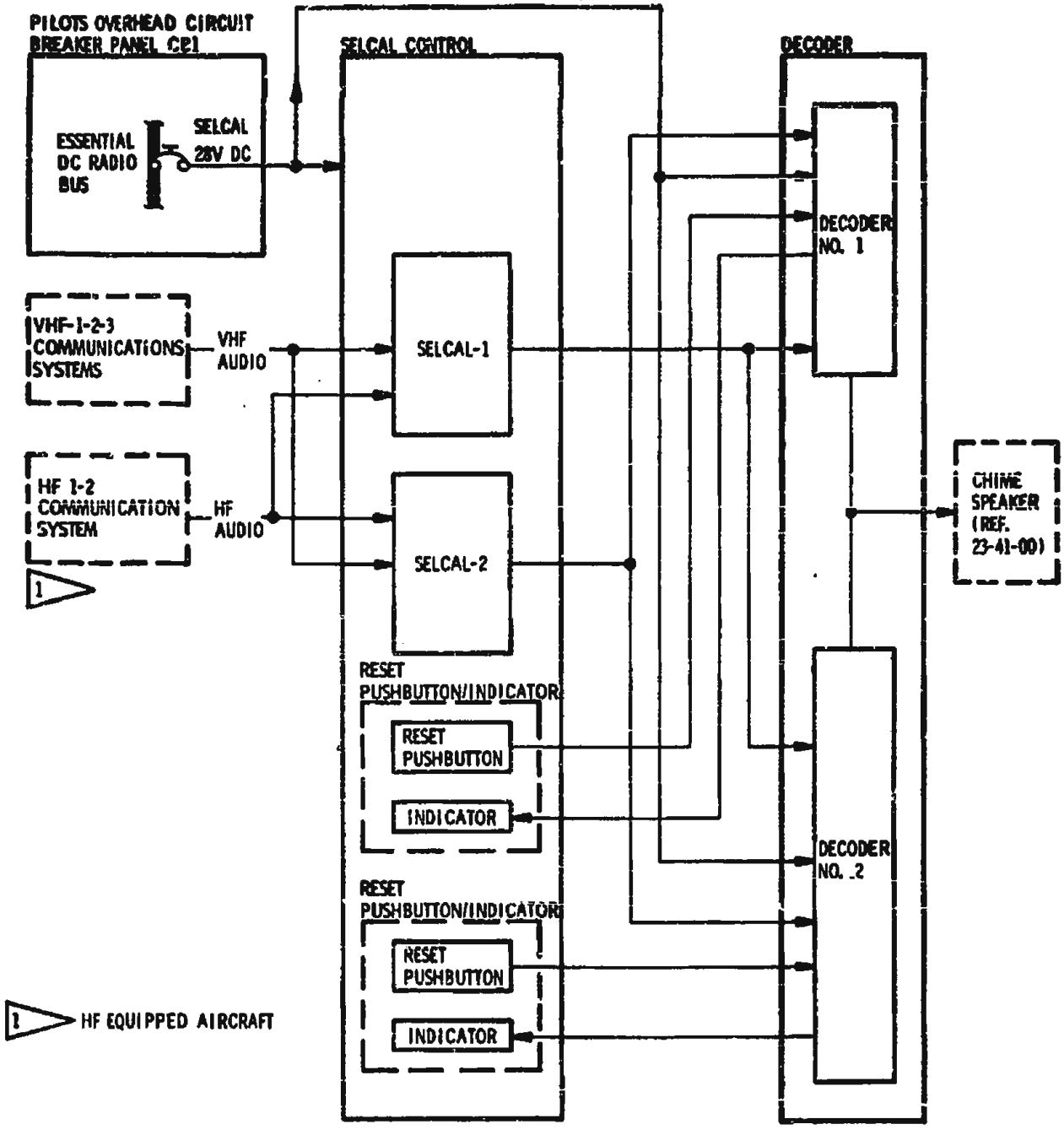
A. Description

The decoder (Ref. Fig. 3) is a transistorized unit consisting of two decoder chassis installed in a single drawer-type housing. Four rotary switches mounted on the front of each decoder chassis permit selection of any 4-letter combination from the 12 letters available at each switch.

Each decoder chassis is a transistorized module containing 12 resonant reed units. The reed units are selected by the four rotary switches on the front of the decoder chassis. The code letters appear in the windows above the switches.

B. Operation

A voltage-dividing network in the frame assembly permits any one of three input signals to be applied to each of the two decoder chassis. Two of these signals will be at a different level than the third. The interrupted circuit (oscillating) signals of each chassis are isolated from each other by diodes in the frame assembly. Each chassis requires a primary voltage of 28V dc at 0.15 amp. Each chassis consists essentially of three basic circuits: an



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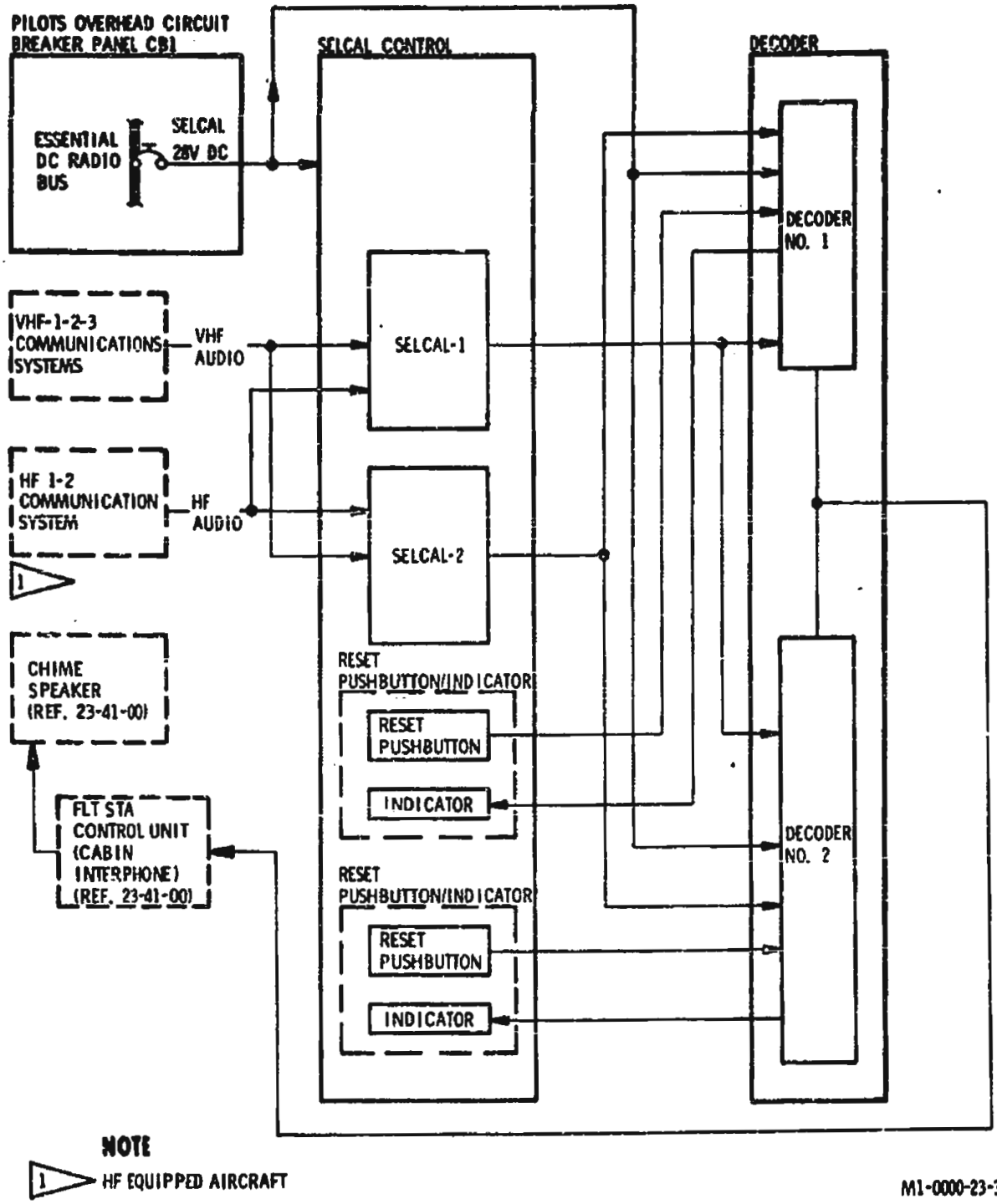
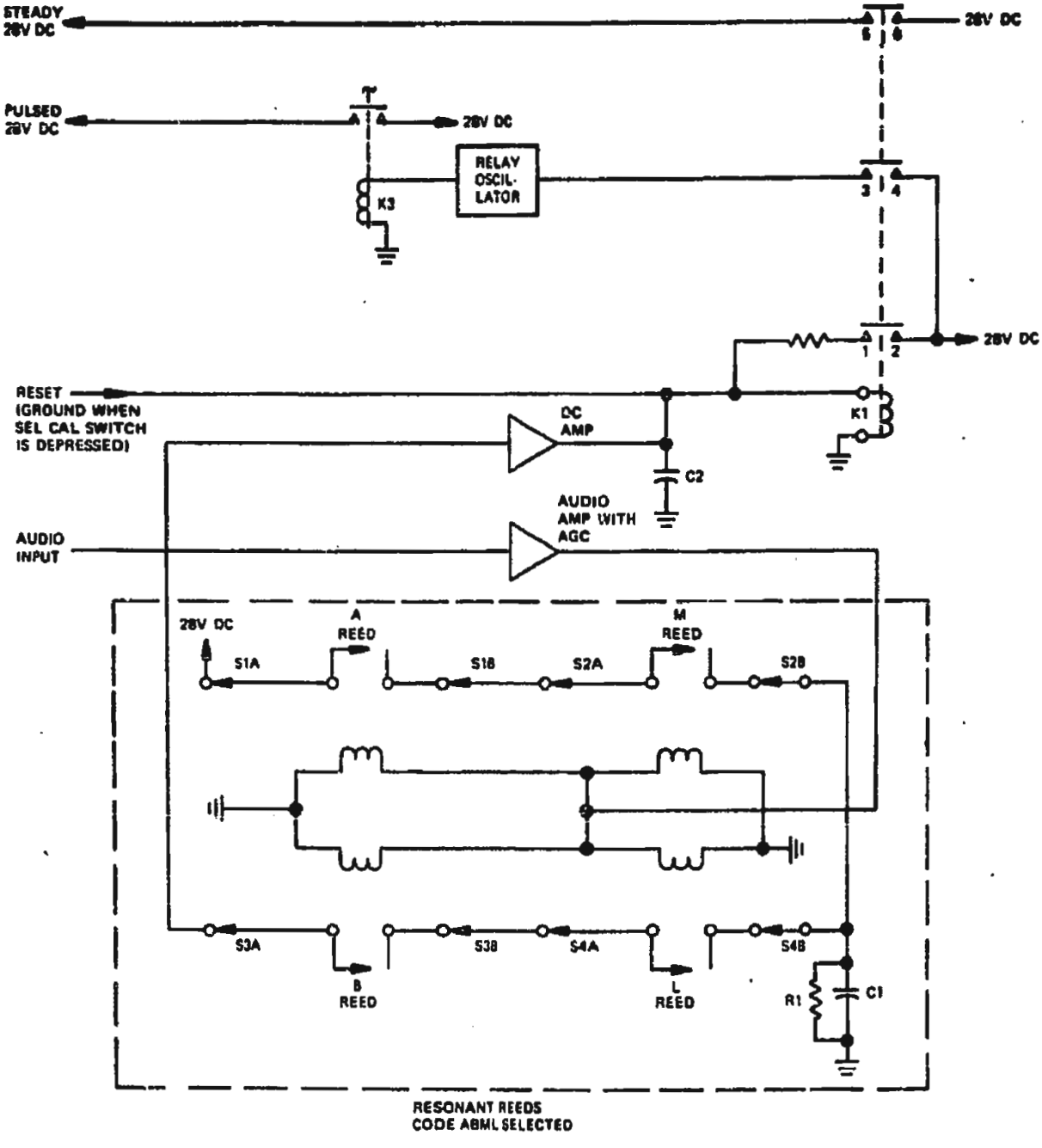
C SELCAL System Block Diagram
C Figure 2



R SELCAL System Block Diagram
R Figure 2



SELCAL Decoder Block Diagram
Figure 3

audio amplifier with AGC, dc amplifier, and relays and relay-oscillator.

(1) Audio Amplifier

A signal input between 70 mV and 2.2V rms is applied to the decoder chassis connector. This signal is amplified in three stages:

(a) Input amplifier

(b) Drive amplifier

(c) Output amplifier

The output amplifier operates as a push-pull amplifier whose output is capacitively coupled to the resonant reed coils. With no signal input, this amplifier is cut off and draws no current. When a signal appears in the audio amplifier circuit, the average current will be 125 to 150 mA.

(2) AGC Circuit

The AGC circuit maintains proper drive to the resonant reed coils. When a tone signal is received, it is amplified and applied to the resonant reed load. The amplified signal is rectified and filtered through a low-pass network. The filtered rectified current is applied to two control diodes. These diodes shunt the audio input, controlling the amplitude of the signal applied to the input transformer.

The AGC action occurs and acts as a potentiometer which controls the amplitude of the signal to the input transformer. If the input signal increases, the arm of the potentiometer moves toward ground and reduces the amplifier output. Conversely, if the input signal decreases, the ac voltage attenuation at the input to the transformer decreases and raises the output to its previous value.

Direct-current isolation is provided for the audio input circuit and the input transformer. The low-pass coupling network reduces the rectifier output at higher tone frequencies, so that these tones produce the greater voltages required by the higher frequency resonant reeds. A reverse-bias voltage is connected to the control diodes for sharper differential action at low-signal inputs.

(3) Resonant Reeds

The resonant reed is essentially a frequency-sensitive relay. When a resonant frequency signal is applied to the coil, the reed vibrates at that frequency. The amplitude of the vibration builds up rapidly (one-tenth of a second or less), and reaches a condition where a contact on the reed intermittently touches a fixed contact.

Reeds of 12 different tones are available in the 300 to 1000 Hz range. The tone frequency is stamped on each reed. Tone frequencies are indicated by letters A through M (except I). The frequency and corresponding alphabetical tone designations of the resonant reeds are listed in Table 1.

(4) DC Amplifier

The dc amplifier and the resonant reeds sample incoming tone signals. If the signals are of the proper frequencies, sequence, amplitude and duration, the dc amplifier and its associated resonant reeds operate relay K1. If there is no signal input, however, or if the input consists only of noise and/or incorrect tones, relay K1 will not actuate.

Assume that AMBL is selected as the four-tone code for one decoder chassis. The proper code signal coming into the decoder consists of two sequential pulses, each composed of two tones (A and M, and B and L). The first pulse, A and M, causes the A and M reeds to vibrate in sympathy with the signals appearing on their respective coils. With these reeds vibrating, each at its own frequency, there are a number of times in each second when they touch their respective contacts simultaneously. At these times there is a complete path for the 28 volts to charge the capacitor (C1). An RC network across each pair of contacts smooth momentary reed contact closures so that current is relatively continuous, rather than in sharp pulses which flow only when both reeds are in contact at the same instant.

A resistor delays the charge into capacitor C1 so that random bursts of noise or unstable heterodyne tones will not instantaneously charge the capacitor. Another resistor is used to discharge the capacitor slowly.

Before the charge can drain from the capacitor, the second pulse tones enter the coil circuits. The B and L reeds now vibrate in sympathy with the signal on their respective coils, and the discharge path to

ground is completed a number of times each second, with an RC network smoothing the intermittent closures.

Relay K1 closes when the voltage it receives rises to about 10 volts. When it closes, it is electrically latched. It remains actuated until released manually by a reset circuit.

(5) Relay K1 and K3

When relay K1 operates, contacts 1 and 2 provide current to actuate the relay coil and keep it latched. Contacts 5 and 6 provide the steady 28V dc signal to the control panel or chime speaker. Contacts 3 and 4 connect 28V dc to the relay oscillator. The relay oscillator provides one-second on-off pulses to the coil of relay K3. Relay K3 contacts provide the pulsed 28V dc signal to the control panel or chime speaker.

(6) Ground Reset

The decoder is reset for the next incoming signal by depressing the SELCAL pushbutton switch on the control panel. This connects a ground to the coil of relay K1. Relay K1 is now shorted out and shuts off the steady and pulsed 28V dc outputs to the control panel.

(7) Relay-Oscillator

When relay K1 operates, contacts 3 and 4 provide 28V dc for the relay oscillator circuit. The relay oscillator provides pulsed (one-second intervals) 28V dc to the coil of relay K3. A pair of relay K3 contacts provides the pulsed dc signal output,.

4. Control Panel

A. Description and Operation

The control panel includes two rotary switches (SELCAL-1 and SELCAL-2) each of which are used to select one of the following audio signals:

C

VHF-1	HF-1 (HF equipped aircraft)
VHF-2	HF-2 (HF equipped aircraft)
VHF-3	

The selected audio is connected to the corresponding decoder input channel.

Two PRESS TO RESET - SELCAL indicators (one located above each rotary switch) turn on when supplied with a 28V dc signal from the corresponding decoder channel. When the indicator is depressed, a reset signal (ground) is supplied to the corresponding decoder channel. Depressing an indicator also connects 28V dc to the indicator light to provide a test of the light.

A MARKER - NORM/HI switch, located in the center of the panel, is part of the Marker Beacon System (Ref. 34-35-00).

R SELCAL SYSTEM - FAULT ISOLATION

R 1. General

R The diagrams and schematics in this section can be used for
R fault isolation any time a fault is reported or suspected. The
R PREREQUISITES listed at the top of each fault isolation diagram
R must be satisfied prior to starting fault isolation. Uncommon
R abbreviations are defined on the using fault code diagram or
R schematic.

R If the flight crew reports a trouble using a fault code number,
R the code number can be found in the Fault Isolation Reference
R Table in the Chapter 23 Fault Code Index. The index specifies
R the exact maintenance manual section, fault isolation diagram,
R and block number on the diagram where the fault isolation
R procedure should start. Schematics are included at the end of
R the section to supplement the fault code diagrams or as an aid
R in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed
R discussion of the Fault Isolation Reporting Method (FIRM) and
R use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 lists the fault isolation diagrams and schematics in
R this section.

R TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	SELCAL Problems
SCHEM 1	SELCAL System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS: COMMUNICATIONS; SELCAL (2322-CB1)	1	PILOTS OVHD CB1 PANEL/210	*
CONTROL PANEL; SELCAL	1	FLT STA; P17: 210A	23-22-02
DECODER; SELCAL	1	FESC; REAR RACK; 112AB	23-22-01
SPEAKER; CHIME	1	FLT STA; OVHD ABOVE DOOR; 210A	23-41-04
SWITCHLIGHT; MASTER RADIO "ESSENTIAL"	1	FLT STA; 210A	20-33-01
TRANSCEIVER; HF	2	FESC; REAR RACK; 112AB	23-11-03
TRANSCEIVER; VHF	3	FESC; REAR RACK; 112AB	23-23-01

*SEE WM EQUIPMENT LIST

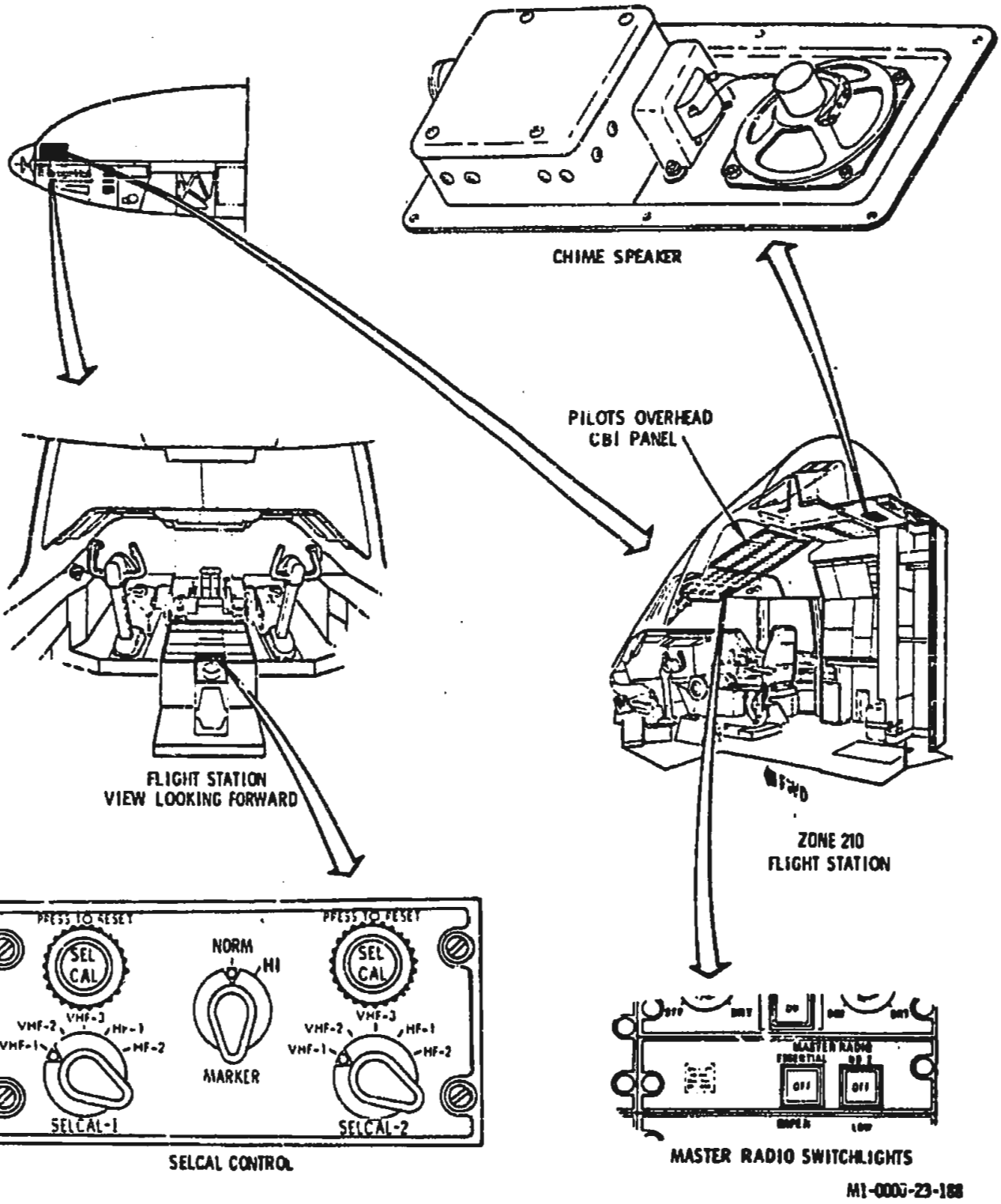
M1-0000-23-161

CR
CR

Component Location Index
Figure 101

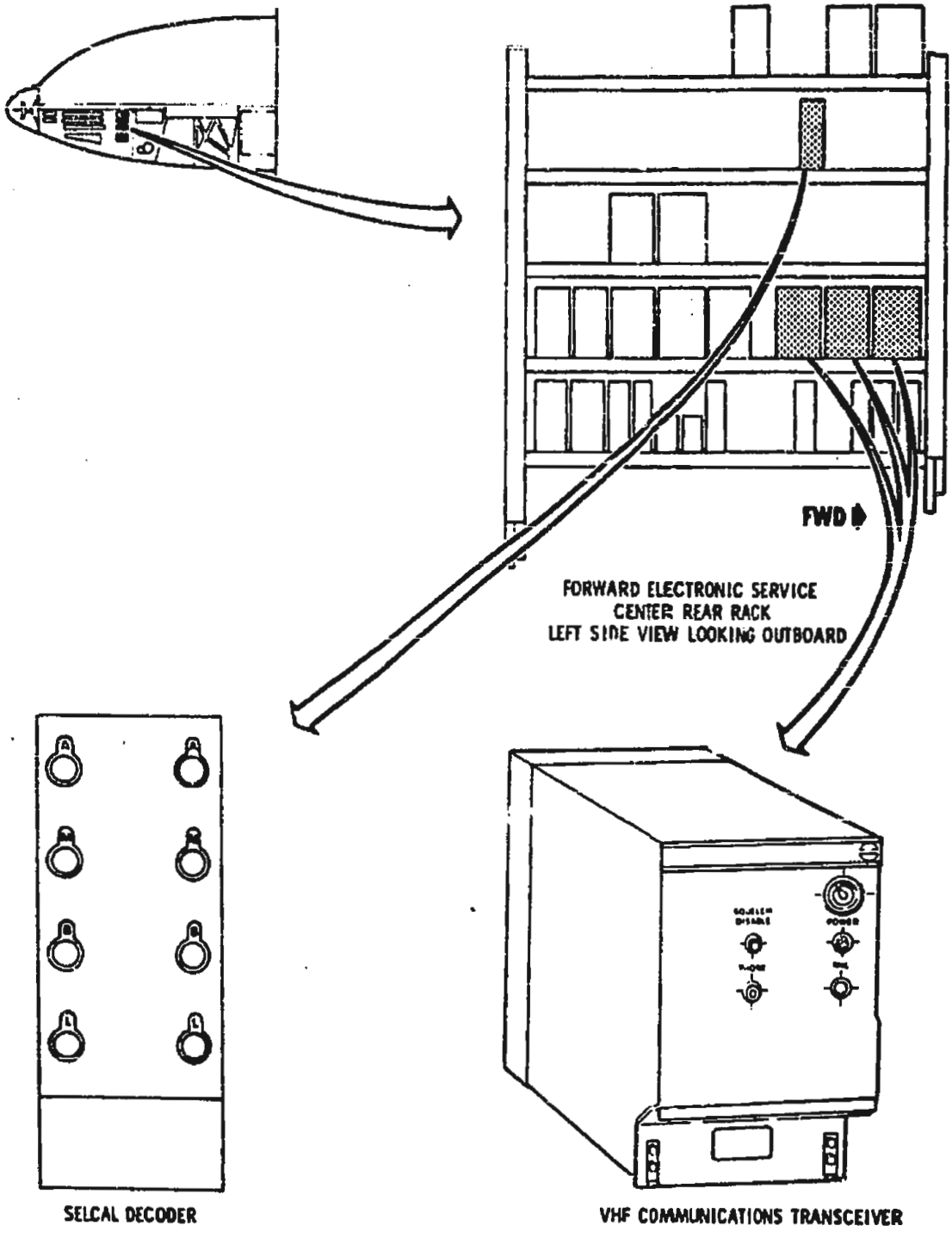
EFFECTIVITY: ALL

001B



R Component Locator Diagram
R Figure 102 (Sheet 1)

R EFFECTIVITY: ALL
R
001B



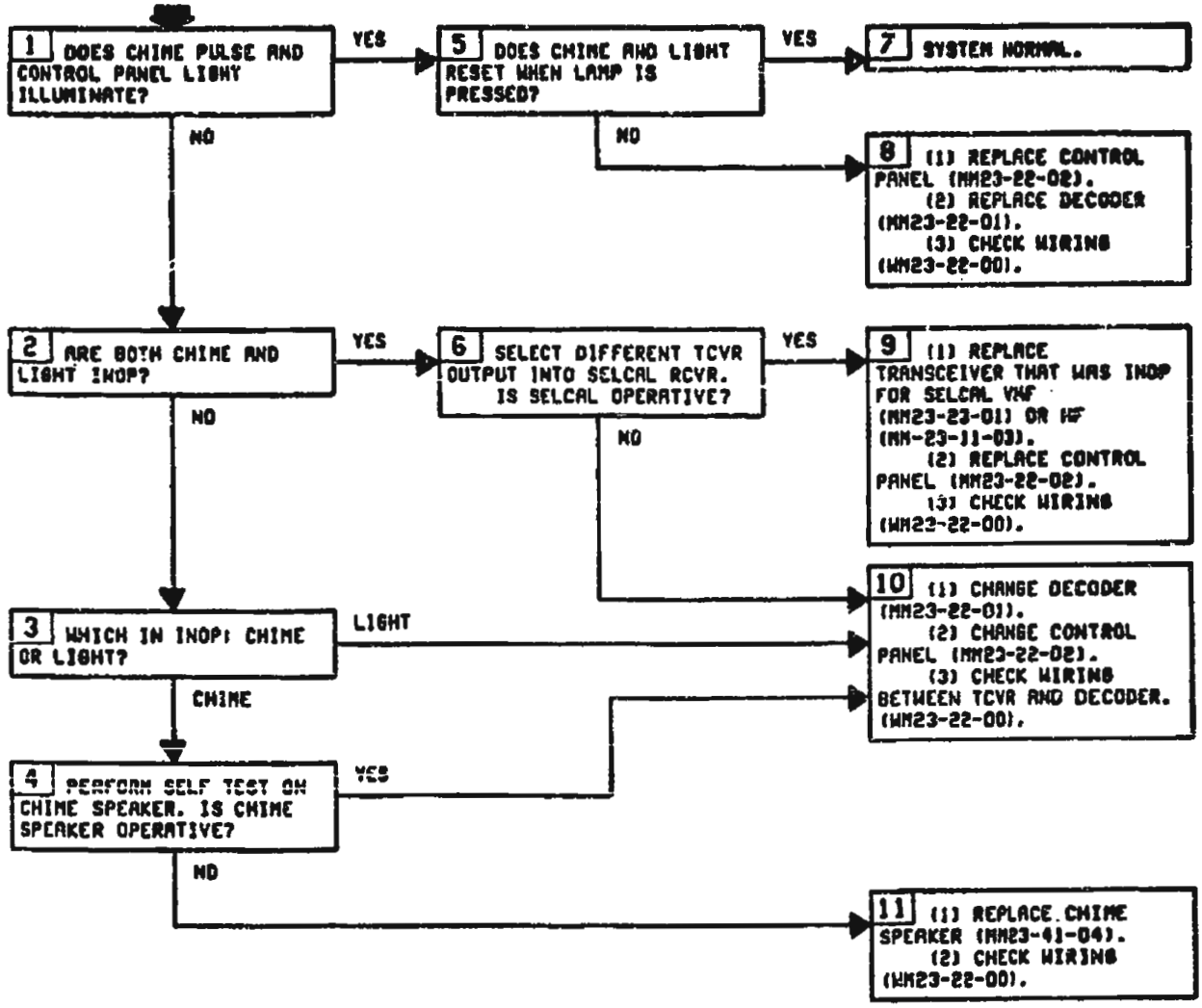
M1-0000-23-476

R
R Component Locator Diagram
Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: 1C3
ON PILOTS OVERHEAD PANEL: MASTER RADIO
ESSENTIAL SWITCHLIGHT "ON"

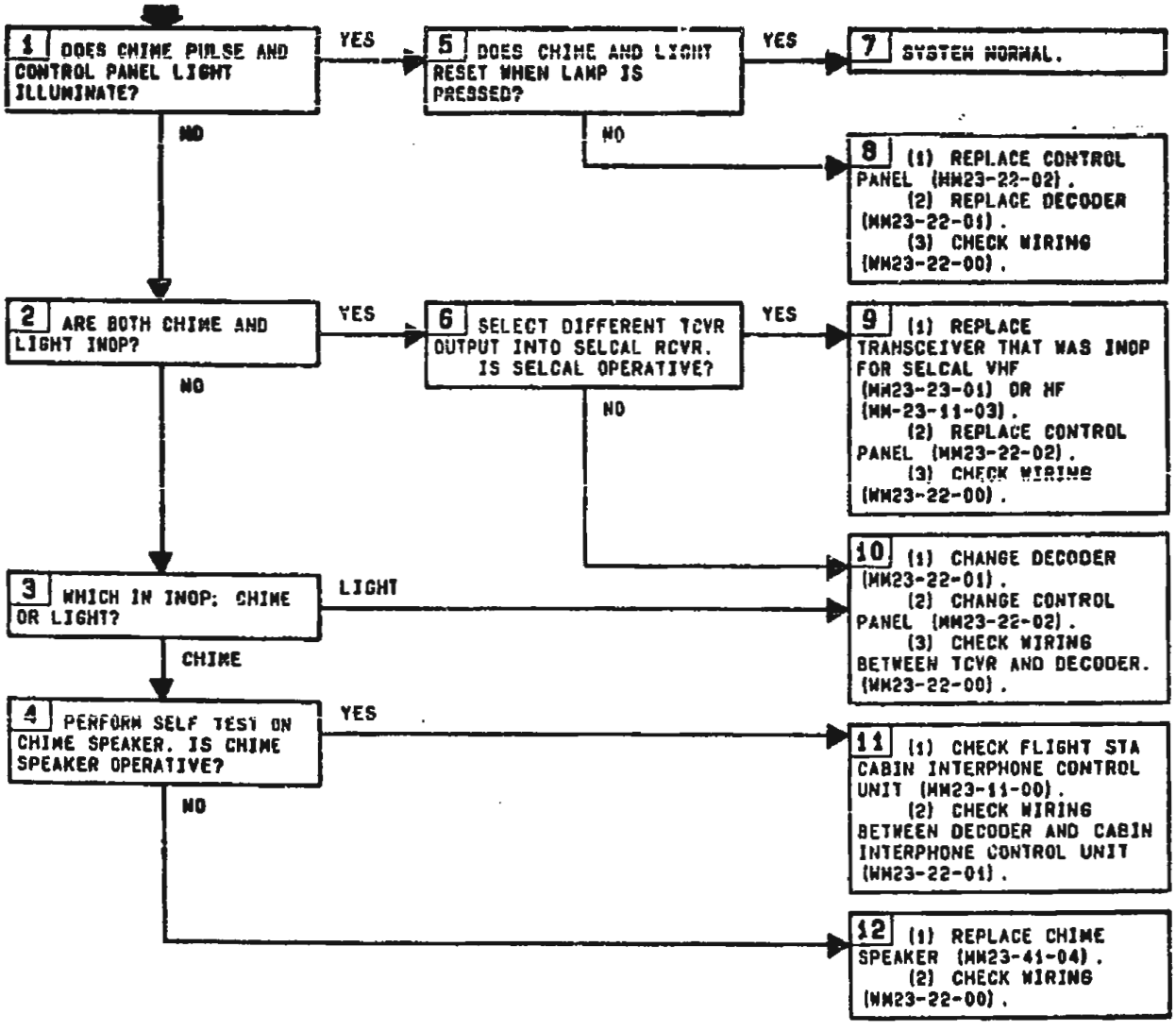
SELCAL PROBLEMS


1 DOES CHIME PULSE AND CONTROL PANEL LIGHT ILLUMINATE?
YES
5 DOES CHIME AND LIGHT RESET WHEN LAMP IS PRESSED?
YES
7 SYSTEM NORMAL.
NO
NO
8 (1) REPLACE CONTROL PANEL (MM23-22-02).
(2) REPLACE DECODER (MM23-22-01).
(3) CHECK WIRING (MM23-22-00).
2 ARE BOTH CHIME AND LIGHT INOP?
YES
6 SELECT DIFFERENT TCVR OUTPUT INTO SELCAL RCVR. IS SELCAL OPERATIVE?
YES
9 (1) REPLACE TRANSCEIVER THAT WAS INOP FOR SELCAL VHF (MM23-23-01) OR HF (MM-23-11-03).
(2) REPLACE CONTROL PANEL (MM23-22-02).
(3) CHECK WIRING (MM23-22-00).
NO
NO
10 (1) CHANGE DECODER (MM23-22-01).
(2) CHANGE CONTROL PANEL (MM23-22-02).
(3) CHECK WIRING BETWEEN TCVR AND DECODER. (MM23-22-00).
3 WHICH IN INOP: CHIME OR LIGHT?
LIGHT
CHIME
4 PERFORM SELF TEST ON CHIME SPEAKER. IS CHIME SPEAKER OPERATIVE?
YES
NO
11 (1) REPLACE CHIME SPEAKER (MM23-41-04).
(2) CHECK WIRING (MM23-22-00).

SELCAL Problems
Figure 103

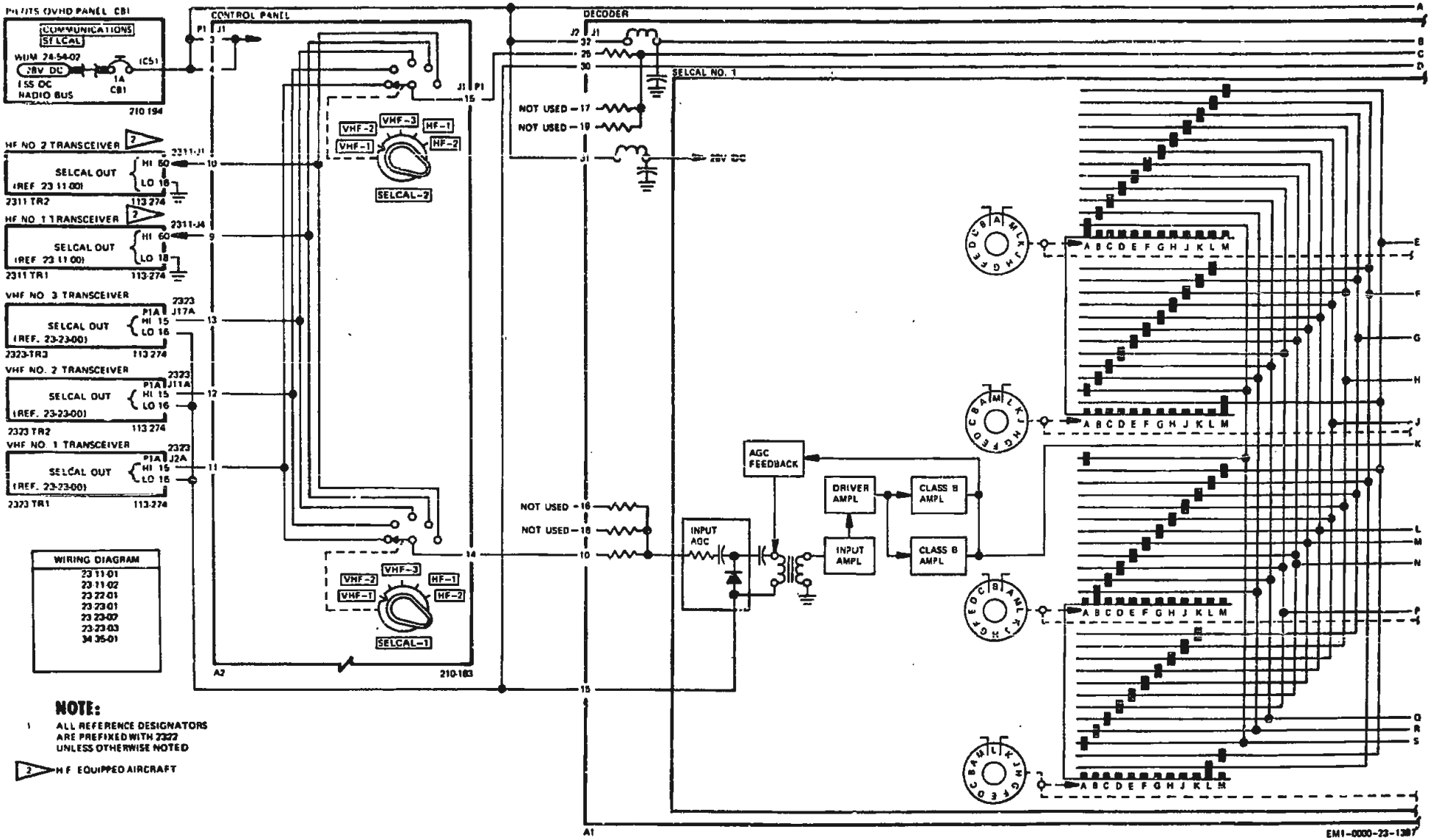
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: 105
ON PILOTS OVERHEAD PANEL: MASTER RADIO
ESSENTIAL SWITCHLIGHT "ON"

SELCAL PROBLEMS


1 DOES CHIME PULSE AND CONTROL PANEL LIGHT ILLUMINATE?
YES
5 DOES CHIME AND LIGHT RESET WHEN LAMP IS PRESSED?
YES
7 SYSTEM NORMAL.
NO
8 (1) REPLACE CONTROL PANEL (MM23-22-02).
(2) REPLACE DECODER (MM23-22-01).
(3) CHECK WIRING (MM23-22-00).
2 ARE BOTH CHIME AND LIGHT INOP?
YES
6 SELECT DIFFERENT TCVR OUTPUT INTO SELCAL RCVR. IS SELCAL OPERATIVE?
YES
9 (1) REPLACE TRANSCEIVER THAT WAS INOP FOR SELCAL VHF (MM23-23-01) OR HF (MM-23-11-03).
(2) REPLACE CONTROL PANEL (MM23-22-02).
(3) CHECK WIRING (MM23-22-00).
NO
NO
10 (1) CHANGE DECODER (MM23-22-01).
(2) CHANGE CONTROL PANEL (MM23-22-02).
(3) CHECK WIRING BETWEEN TCVR AND DECODER. (MM23-22-00).
3 WHICH IN INOP: CHIME OR LIGHT?
LIGHT
CHIME
4 PERFORM SELF TEST ON CHIME SPEAKER. IS CHIME SPEAKER OPERATIVE?
YES
11 (1) CHECK FLIGHT STA CABIN INTERPHONE CONTROL UNIT (MM23-11-00).
(2) CHECK WIRING BETWEEN DECODER AND CABIN INTERPHONE CONTROL UNIT (MM23-22-01).
NO
12 (1) REPLACE CHIME SPEAKER (MM23-41-04).
(2) CHECK WIRING (MM23-22-00).

M1-0000-23-3845

R SELCAL PROBLEMS
R Figure 103



WIRING DIAGRAM
23-11-01
23-11-02
23-22-01
23-23-01
23-23-02
23-23-03
34-35-01

NOTE:

1. ALL REFERENCE DESIGNATORS ARE PREFIXED WITH 2322 UNLESS OTHERWISE NOTED

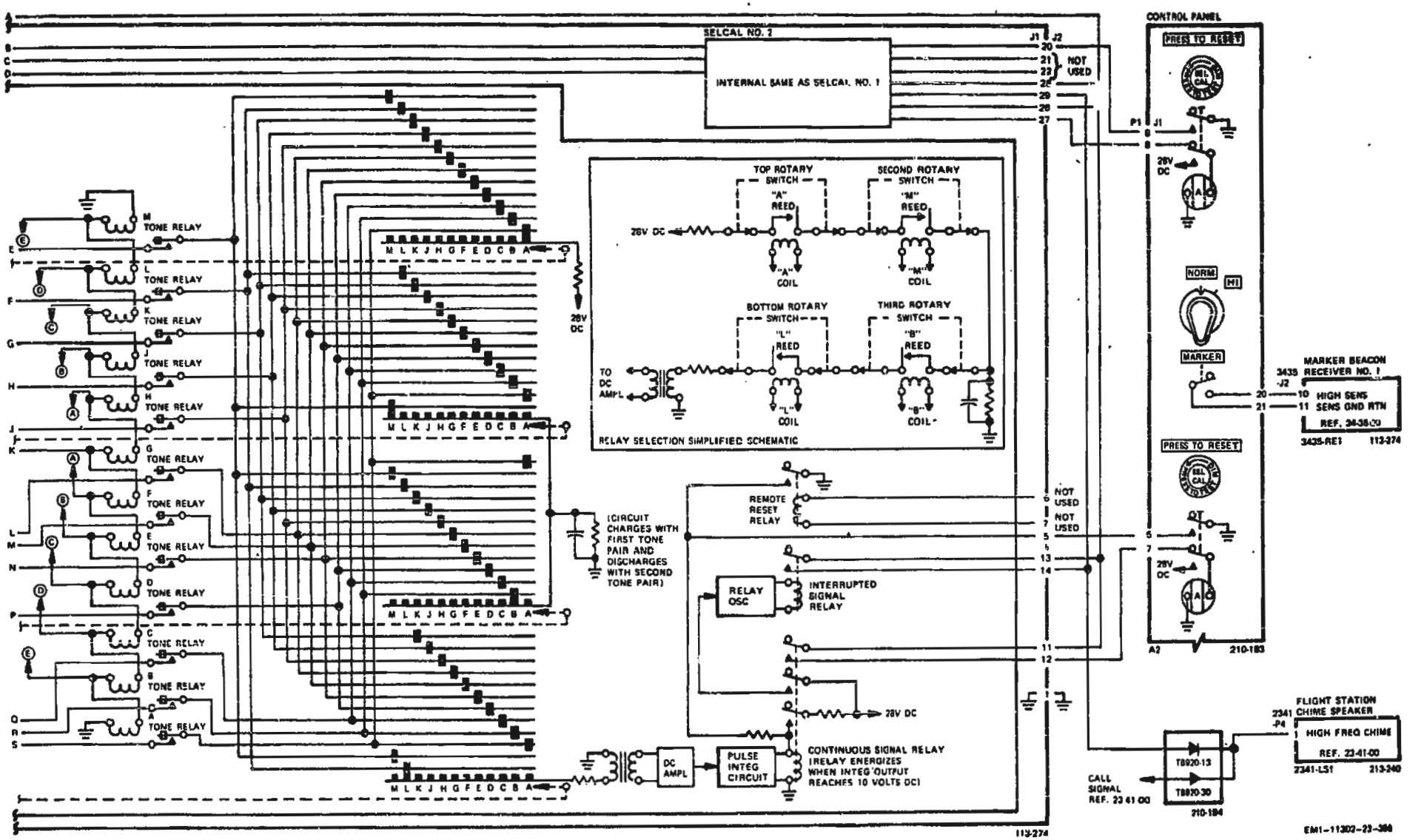
2 HF EQUIPPED AIRCRAFT

CR
CR

SELCAL System Schematic
SCHEM 1 (Sheet 1)

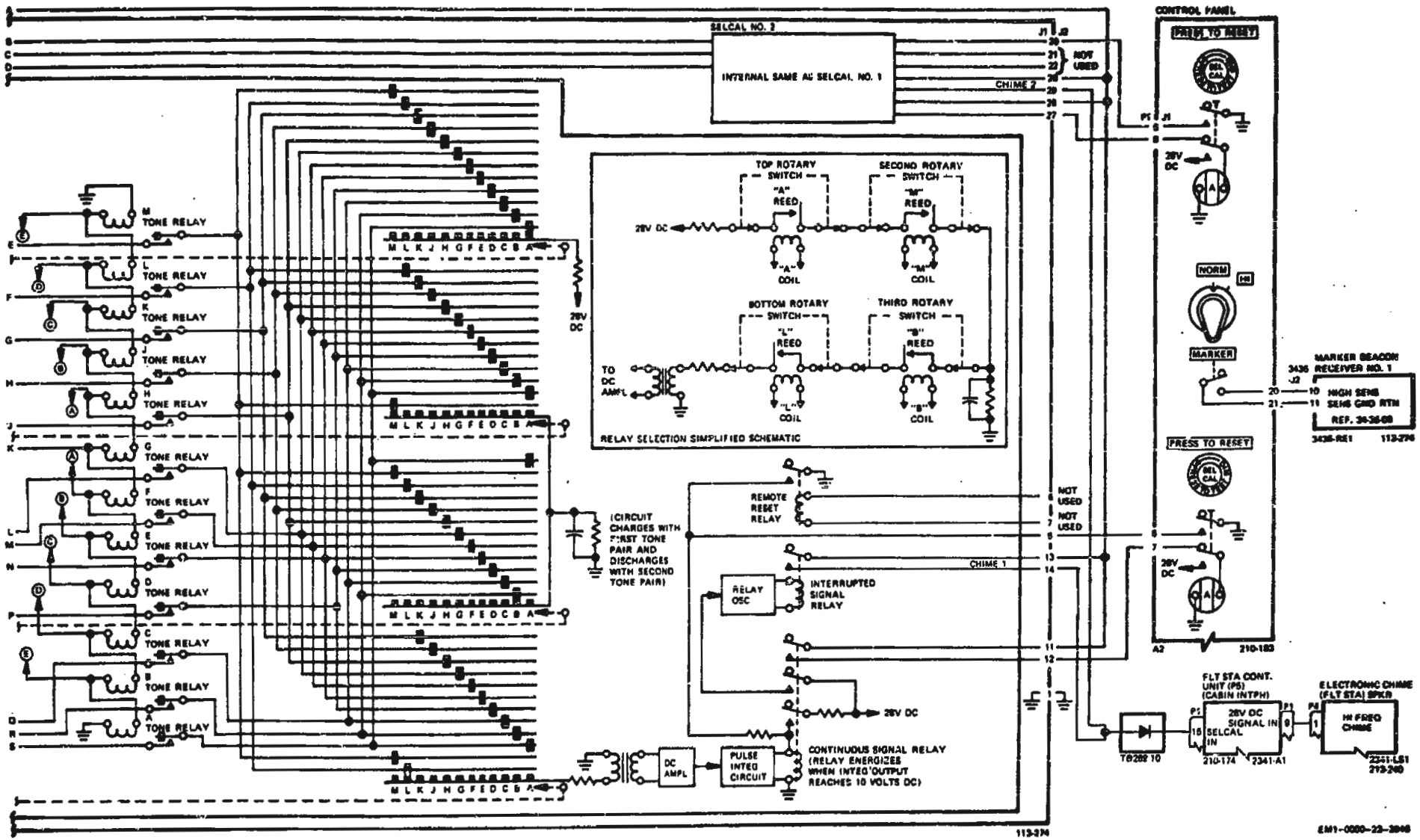
EFFECTIVITY: ALL

0018



SELCAL System Schematic
SCHEM 1 (Sheet 2)

R EFFECTIVITY: 001-031
R
001B



SELCAL System Schematic
SCHEM 1 (Sheet 2)

EFFECTIVITY: 032-999

001B

SELCAL (SELECTIVE CALLING) SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

CR CR	23-11-00	HF Communication System - Adjustment and Test (HF equipped aircraft)
	23-23-00	VHF Communication System - Adjustment and Test
	23-41-00	Cabin and Galley Interphone System - Adjustment and Test
	23-51-00	Audio Integrating System - Adjustment and Test
	24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) In forward electronic service center (FESC) at rear rack, note both four-letter codes set on SELCAL decoder (adjust as necessary for test).

(2) Turn on electrical power (Ref.24-00-00).

CR CR (3) Verify thatHF communication system (HF equipped aircraft, Ref. 23-11-00), VHF communication system (Ref. 23-23-00), cabin and galley interphone system (Ref. 23-41-00), and audio integrating system (Ref. 23-51-00) are turned on.

C C C NOTE: If possible, SELCAL operational test should be combined withHF and VHF communication system operational tests. HF tests applicable to HF equipped aircraft.

(4) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breaker ESS-COMMUNICATIONS - SELCAL (C5) is closed.

(5) On pilots center console at SELCAL control panel, select VHF - 1 on SELCAL - 1 and SELCAL - 2 switches.

(6) On VHF No. 1 control panel, select authorized control tower or maintenance test frequency (Ref. 23-23-00). Establish communications and have test station transmit SELCAL code(s).

Verify that SELCAL - 1 and - 2 alert lights come on steady, and that HI chime tone sounds at 1-second intervals on flight station chime speaker (Ref. 23-41-00).

(7) Depress SELCAL - 1 and - 2 alert lights.

Verify that lights go out and chime is silenced.

R WARNING: ON HF EQUIPPED AIRCRAFT,
R DO NOT KEY HF TRANSMITTER WHEN ANY FUELING OR
R DEFUELING OPERATION IS TAKING PLACE WITHIN 100
R FEET OF AIRCRAFT. REFERENCE WOULD BE ANTENNA
R (LEADING EDGE BASE OF VERTICAL FIN) TO INTERFACE
R POINT (HOSE CONNECTION) OF FUELING/DEFUELING
R AIRCRAFT.

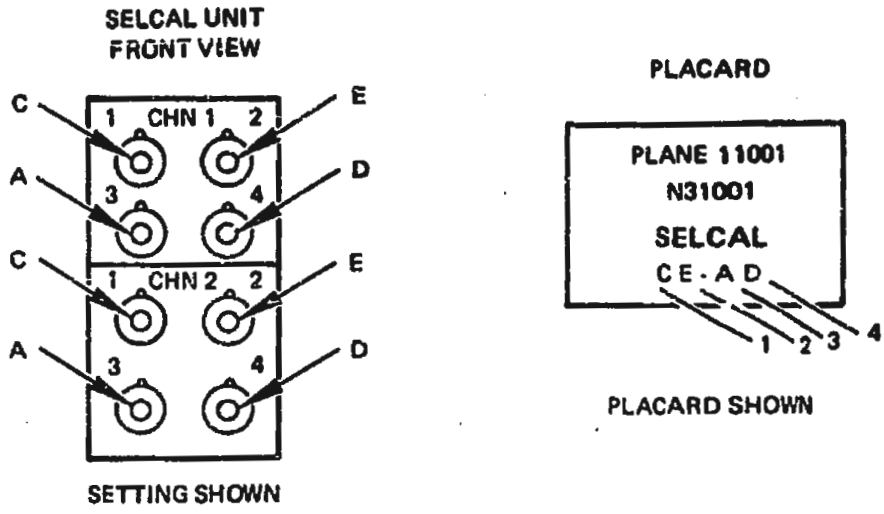
R CAUTION: ON HF EQUIPPED AIRCRAFT,
R DO NOT TRANSMIT WHEN ANOTHER AIRCRAFT WITH HF
R EQUIPMENT IN RECEIVE MODE IS WITHIN 250 FEET.
R REFERENCE WOULD BE ANTENNA TO ANTENNA.

C (8) Repeat Steps (5), (6), and (7) for VHF-2 and VHF-3, and
C for HF-1 and HF-2 (HF equipped aircraft, Ref.
C 23-11-00).

C (9) Turn HF-1 and HF-2 mode selector switches to OFF (HF
C equipped aircraft, Ref. 23-11-00).

(10) Turn off electrical power (Ref. 24-00-00).

(11) On SELCAL decoder front panel, verify that code selectors are set for code assigned to aircraft.



NOTE: CHANNEL NO. 1 AND CHANNEL NO. 2 ARE SET IDENTICALLY.

DASH NO.	PLANE NO.	LICENSE NO.	SELCAL NO.	DASH NO.	PLANE NO.	LICENSE NO.	SELCAL NO.
1	11001	N31001	CE-AD	228	21018	N31018	AG-HJ*
2	11002	N11002	CE-AF	229	21019	N31019	BM-DG*
3	11003	N11003	CE-AG	230	21020	N41020	BM-FH*
4	11004	N11004	DG-AL	231	21021	N31021	CF-EK*
6	11005	N11005	DH-AC	232	21022	N31022	CF-GH*
7	11006	N11006	DH-AF	233	21023	N31023	CH-BF*
				174	21024	N31024	AE-HL*
9	11008	N31008	DH-AJ	175	31025	N81025	AE-HM*
10	11009	N31009	DH-AK	176	31026	N81026	AE-JK*
11	11010	N31010	DH-AL	177	21027	N81027	AE-JL*
12	11011	N31011	DH-AM	178	31028	N81028	AE-JM*
14	11012	N41012	DH-CK	179	31029	N31029	AE-KL*
15	11013	N31013	DH-CL	180	31030	N31030	AE-KM*
54	11014	N31014	LM-CK	181	31031	N31031	AE-LM*
16	11015	N31015	DH-CM				
98	11016	N41016	AB-GM				
151	11017	N15017	AE-CK				

*HF EQUIPPED

(Ref. Dwg 1-58776-( ))

M1-0004-23-1303

CR
CR

SELCAL Code and Plane Number Placard
Figure 501

EFFECTIVITY: ALL

0018

SELCAL DECODER - REMOVAL AND INSTALLATION

1. Referenced Procedure

23-22-00 SELCAL System - Adjustment and Test

2. Removal/Installation

A. Removal

R (1) On pilots overhead circuit breaker panel CB1, zone 210,
R open and tag circuit breaker ESS - COMMUNICATIONS - SELCAL (C5).

(2) In forward electronic service center, zone 113, locate decoder on rear avionics rack (Ref. Fig. 401).

(3) Loosen knurled thumbscrew and disengage from mounting bracket, then remove decoder.

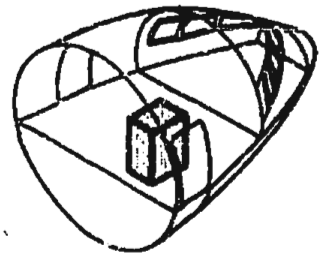
B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

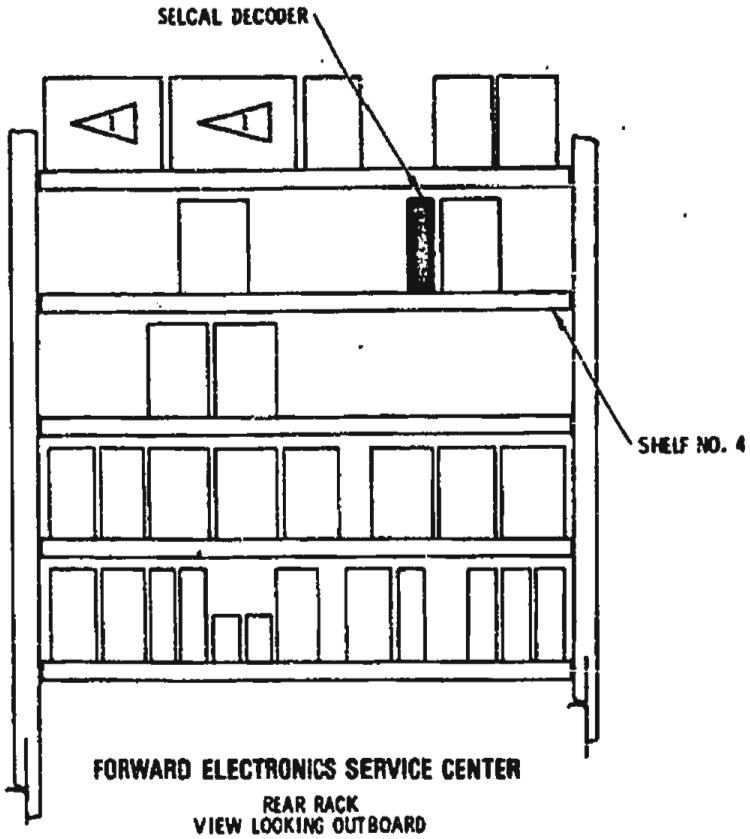
(2) Install decoder and secure with knurled thumbscrew (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step 2A(1).

(4) Perform operational test of SELCAL system (Ref. 23-22-00).



ZONE 113



1 ALL HF EQUIPPED AIRCRAFT ONLY

M1-0002-23-410

SELCAL Decoder - Removal and Installation
Figure 401

SELCAL CONTROL PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-22-00	SELCAL SYSTEM - Adjustment and Test
34-35-00	Marker Beacon System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESS COMMUNICATIONS - SELCAL (C5).

(2) Release control panel mounting fasteners and lift panel from pilots center console, zone 210, (Ref. Fig. 401).

(3) Disconnect connector on underside of panel and remove control panel.

B. Installation

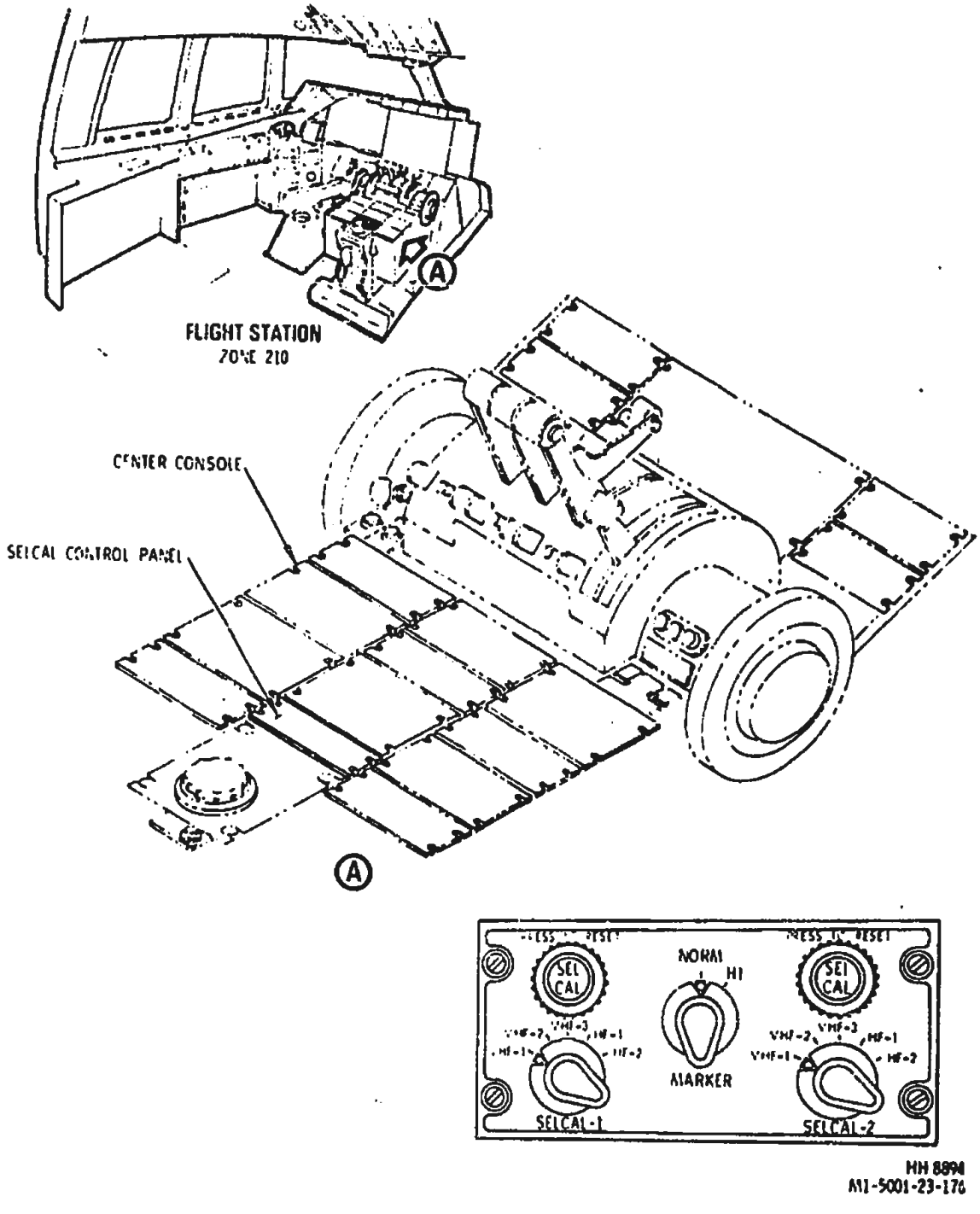
(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Connect connector to underside of control panel and press panel firmly into mount while securing fasteners (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step 2A(1).

(4) Perform operational test of SELCAL system (Ref. 23-22-00).

R (5) Verify that marker beacon system operates in both HI
R and LO sensitivity modes (Ref. 34-35-00).



SELCAL Control Panel - Removal and Installation
Figure 401

VHF COMMUNICATION SYSTEM - DESCRIPTION AND OPERATION

1. General

The VHF communication system (Ref. Fig. 1) consists of three subsystems which provide line-of-sight communications capability. The subsystems are designated VHF No. 1, VHF No. 2, and VHF No. 3.

The transceivers are located in the forward electronics service center, rear rack shelf no. 2, zone 113. The dual-head control panels are located on the pilots center console, zone 210. The three antennas are attached to the outer skin of the fuselage. Antenna No. 1 is located above the passenger compartment ceiling
R near the fuselage top center line, zone 233. Antenna No. 2 is
R located below the mid electrical service center near the
R fuselage bottom center line, zone 137. Antenna No. 3 is located
R below the aft cargo compartment near the fuselage bottom center line, zone 154.

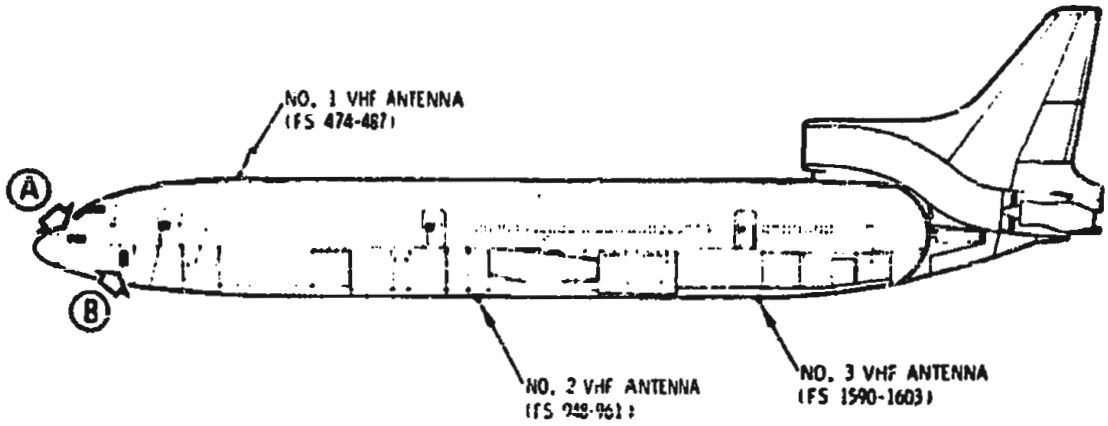
R Power for the VHF Communication System is supplied to VHF No. 1 by the Essential Communication Bus, to VHF No. 2 by the DC Ground Service Bus, and to VHF No. 3 by the No. 2 DC Radio Bus. The VHF System No. 1 and No. 3 circuit breakers are located on the pilots overhead circuit breaker panel CB1, zone 210. The VHF System No. 2 circuit breaker is located on the Flight Engineer/Second Officer (FE/SO) overhead circuit breaker panel CB2, zone 215.

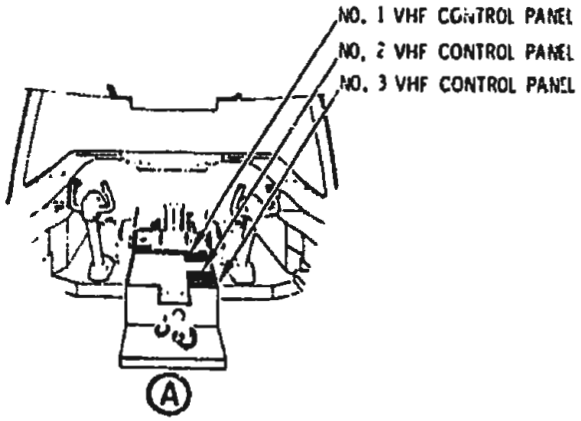
R The system frequency range is 118.000 to 135.975 MHz with
R channel spacing of 25 KHz. Each dual-head control panel is used
R to select two frequencies for each transceiver. The last digit (KHz) is not displayed. The control head in use is indicated by a light above the frequency window. The desired control head is selected by the TFR FREQ SEL toggle switch between the control
R heads.

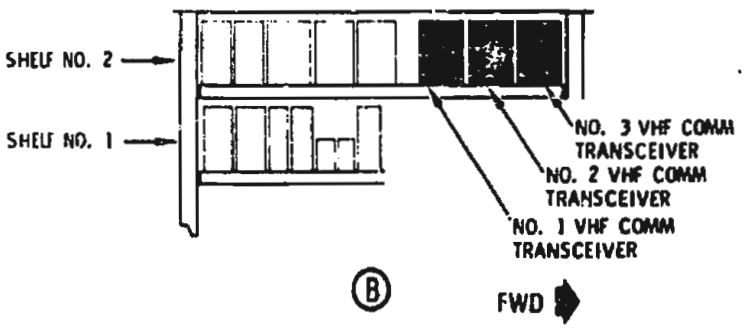
Each VHF system (Ref. Fig. 2) interfaces with the audio integrating system for impedance matching to microphones, headsets, and speakers (Ref. 23-51-00), and with the selective calling (SELCAL) system to alert crew members by aural and visual indications of incoming calls (Ref. 23-22-00). The VHF systems at the Captains, First Officers, and FE/SO positions also interface with the voice recorder system (Ref. 23-71-00).

2. Operation

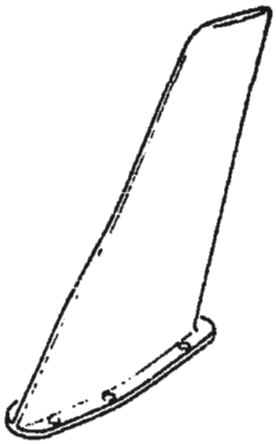
The VHF systems are operational in the receive mode when circuit breakers ESSENTIAL COMMUNICATIONS BUS - VHF No. 1 (A11), and



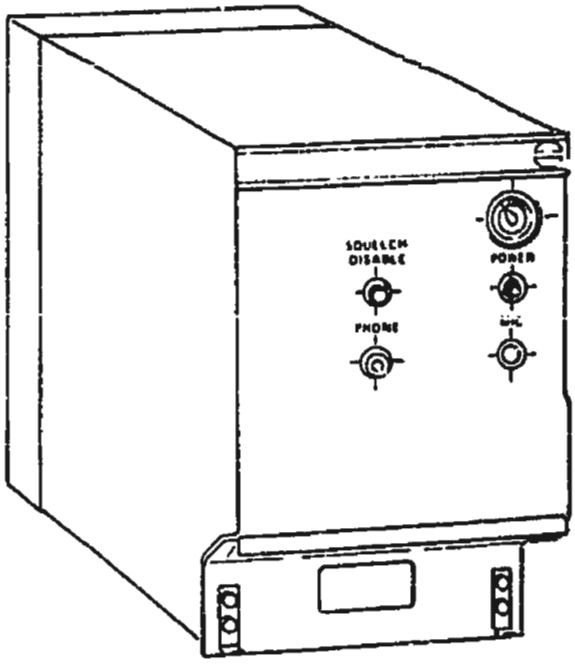




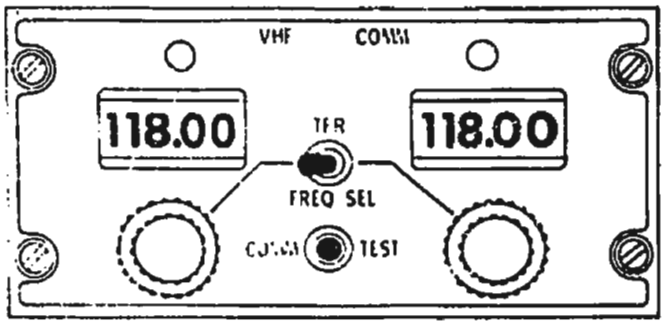
R VHF Communication System Equipment and Location
R Figure 1 (Sheet 1)



VHF ANTENNA

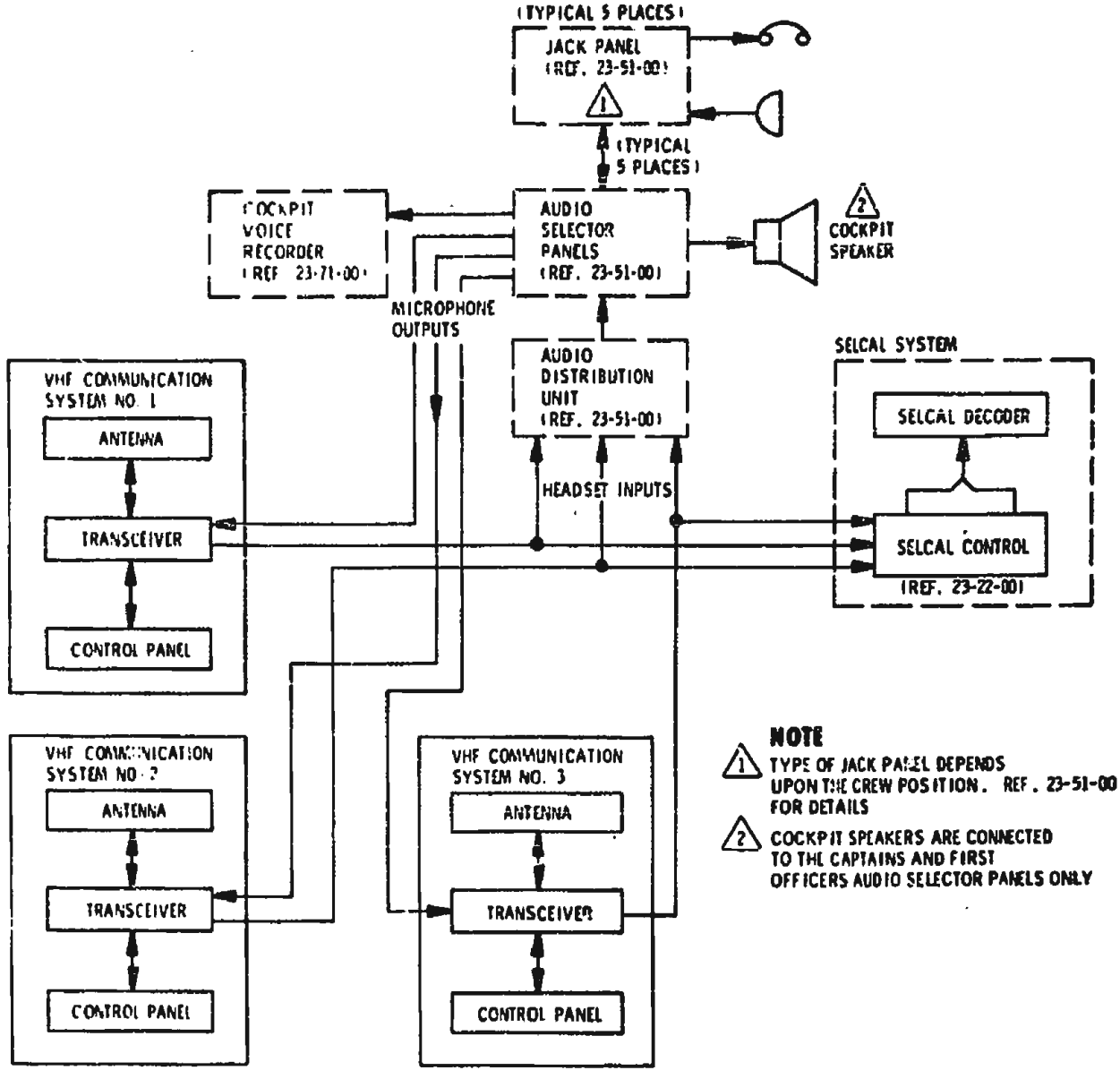


VHF COMMUNICATIONS TRANSCEIVER



HH 7707
MI-5001-23-193

R VHF Communication System Equipment and Location
R Figure 1 (Sheet 2)



HH 5208
EA11-2201-23-208

VHF Communication System Block Diagram
Figure 2

COMMUNICATION - VHF No. 3 (C23) on the pilots overhead circuit breaker panel CB1, zone 210, and GROUND SERVICE - VHF No. 2 (L4) on the FE/SO overhead circuit breaker panel CB2, zone 215, are closed.

Audio from all three VHF transceivers is connected to impedance matching and distribution circuits in the audio distribution
R unit (Ref. 23-51-00). When the VHF-1, VHF-2, and/or VHF-3 audio selectors are depressed on any audio selector panel(s), the selected VHF receiver audio is connected to the corresponding flight crew headsets.

When the MIC SEL VHF-1, VHF-2, or VHF-3 selector is depressed on any audio selector panel(s), the corresponding flight crew microphone is connected to the selected VHF transceiver. Depressing the microphone PTT switch keys the transmitter. Transmitter sidetone audio is connected to the headsets through the receiver audio circuits.

3. Control Panel

A. Description and Operation

Each control panel has two frequency display windows, with the first five digits of the frequency selected on each half of the dual control visible in the corresponding window. The sixth digit (thousandths of megahertz) is not displayed. Frequencies are selected with a concentric pair of knobs located below each window. The larger (outer) knob of each pair is used to select whole-megahertz frequencies (units and tens), and the smaller (inner) knob is used to select fractional-megahertz frequencies (tenths and hundredths). The panels provide frequency selections in 25 KHz increments
R from 118.000 MHz to 135.975 MHz.

A TFR FREQ SEL switch in the center of the panel is used to select one of the control heads. The control head in use is indicated by a light above the frequency display window.

A COMM TEST switch in the center of the panel between the frequency selector knobs disables the receiver squelch circuit when depressed.

Frequency selection is by the two-out-of-five method, with
R five outputs for each digit except the last (0.005 MHz), which has only two outputs. For any digit selected in the first four positions, two of the five outputs will be connected to the frequency select common (ground), and the
R other three will be open. When 0.000 MHz is selected at the
R last position the 0.000 output is connected to the frequency

select common and the 0.005 output is open; when 0.005 MHz is selected, the outputs are reversed.

4. Transceiver

A. Description and Operation

The transceiver (Ref. Fig. 3) has three planar assemblies. The VHF synthesizer planar assembly supplies the injection frequencies for the VHF receiver and transmitter. The VHF receiver planar assembly accepts the RF signal picked up by the aircraft antenna, detects the audio signal, and supplies the audio information to the audio integrating system (Ref. 23-51-00). The transmitter-modulator planar assembly provides the transmitted RF output, modulated at 90 percent from a microphone audio signal, or from an ATCSS (air traffic control signaling system-provisions) data input.

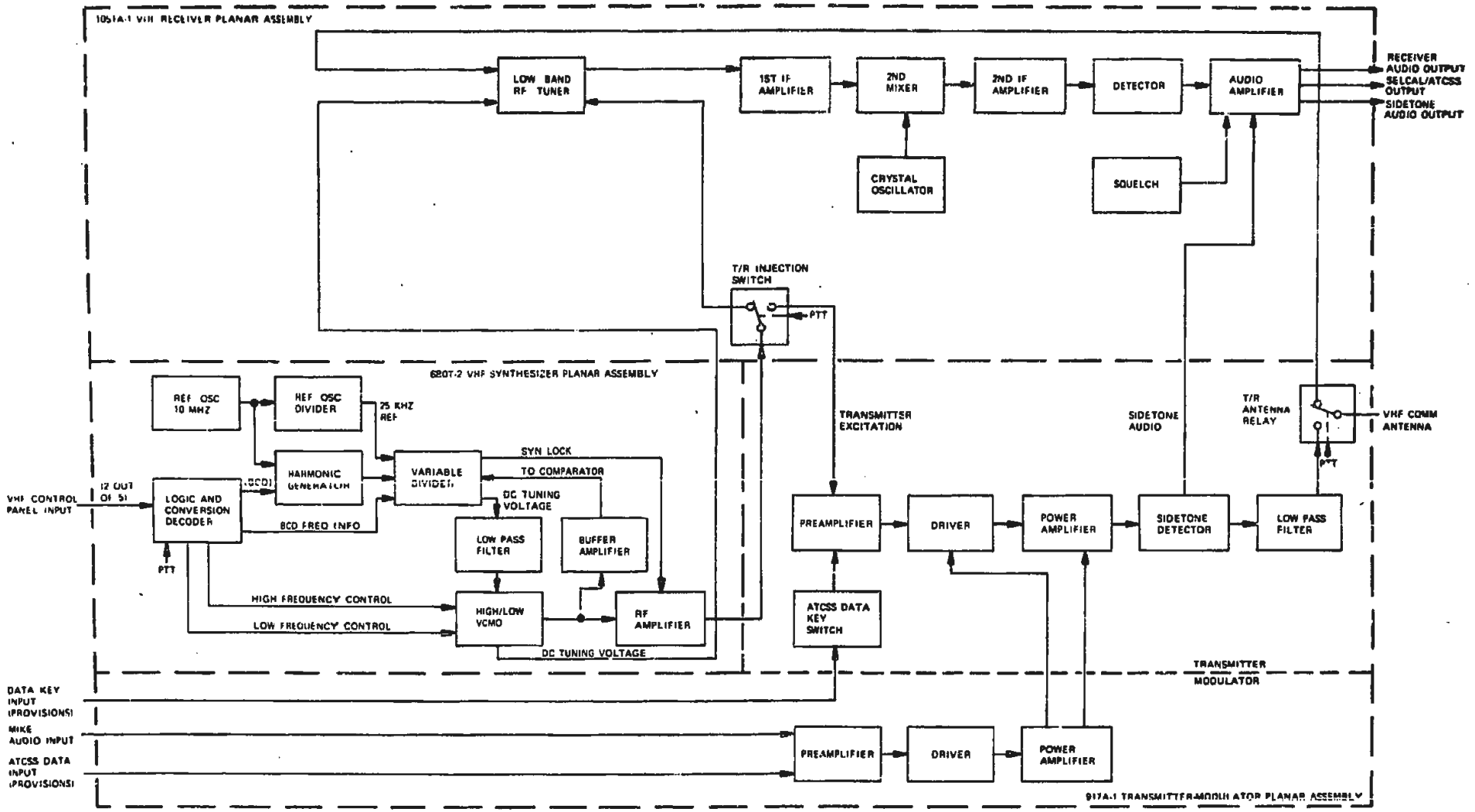
(1) Receive Mode

The RF signals are coupled from the antenna through the transmit/receive antenna relay in the transmitter to the input of the RF tuner. The RF tuner consists of a preselector circuit which selects the desired frequency, and a mixer circuit which mixes the preselected frequency with an injection frequency.

The synthesizer provides the injection frequency (18 MHz above the selected frequency) and a dc tuning voltage to the RF tuner preselector and mixer circuits.
R A dc voltage derived from the detection of the RF signal is applied to the automatic gain control (AGC) amplifier and to the carrier squelch circuit. The output of the AGC amplifier controls the gains of the IF amplifiers. The carrier squelch circuit overrides the carrier/noise squelch circuit when the signal-to-noise ratio is low but the RF carrier signal is strong.

(2) Transmit Mode

The RF carrier frequency is generated in the synthesizer. The PTT signal applied to the synthesizer decoder logic disables the frequency offset function of the logic. The decoder logic activates the high- or low-frequency control line as necessary to cause the high/low VCMO to generate an RF output at the frequency selected on the control panel. The RF output is applied to the transmit/receive injection switch in the receiver.



EM1 5100-23 660

VHF Transceiver Block Diagram
Figure 3

The PTT signal energizes the receiver transmit/receive injection switch. The synthesizer injection is removed from the RF tuner and applied to the input of the transmitter. The PTT signal also removes the RF tuner supply voltage.

When the PTT signal is applied, the transmitter/modulator power supply is activated and the transmitter low-pass output filter is connected to the antenna by the transmit/receive antenna relay.

The transmitter RF circuits include a preamplifier, a predriver, a driver, and a power amplifier. The RF circuits are tuned for broad bandpass operation.

The synthesizer RF output signal applied to the transmitter preamplifier is amplified and applied to the predriver and driver stage. The driver provides sufficient drive for the power amplifier. The amplified RF signal is routed through the sidetone detector, the low-pass filter, and the transmit/receive antenna relay to the antenna. A directional coupler provides FWD and REFL power to the front panel meter.

Microphone audio is applied to the modulator circuit. The microphone audio is amplified by the modulator, the predriver, and the driver, and then applied to the power amplifier. The audio level at the power amplifier is sampled by an audio compression circuit. A feedback voltage is derived and applied to the first audio amplifier to control the gain of the modulator. The audio output from the power amplifier is applied through a modulation transformer to the RF predriver, driver, and power amplifier section of the transmitter. The sidetone circuit detects the modulation of the RF carrier and applies the detected audio to the audio amplifier in the receiver. The audio signal is amplified and applied to the audio integrating system.

R VHF COMMUNICATION SYSTEM - FAULT ISOLATION

R 1. General

R The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 lists the fault isolation diagrams and schematics in this section.

R TABLE 101

R FIGURE	TITLE
R 101	Component Location Index
R 102	Component Locator Diagram
R 103	VHF Communication System Fault Isolation
R SCHEM 1	VHF Communication System No. 1 Schematic
R SCHEM 2	VHF Communication System No. 2 Schematic
R SCHEM 3	VHF Communication System No. 3 Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ANTENNA – VHF COMM	3	TOP AND BTM FSLG CENTERLINE	23–23–02
CIRCUIT BREAKERS:			
VHF NO. 1 (2323-CB1)	1	PILOTS OVHD CB1 PANEL/210 (A11)	*
VHF NO. 2 (2323-CB2)	1	FE/SO OVHD CB2 PANEL/216 (L4)	*
VHF NO. 3 (2323-CB3)	1	PILOTS OVHD CB1 PANEL/210 (C23)	*
DISTRIBUTION UNIT – AUDIO	1	FESC; REAR RACK; 112AB	23–51–03
PANEL – AUDIO SELECTOR, CAPT/FO	2	FLT STA; P17	23–51–04
PANEL – AUDIO SELECTOR, F/E	1	FLT STA; P1	23–51–04
PANEL – AUDIO SELECTOR, FESC	1	FESC; AT FLT STA ACCESS; 112AB	23–51–04
PANEL – AUDIO SELECTOR, OBS	1	FLT STA; L OF OBS SEAT	23–51–04
PANEL – CONTROL, VHF COMM	3	FLT STA; P17	23–23–03
PANEL – JACK, MIC SELECTOR CAPT	1	FLT STA; P14	23–51–09
PANEL – JACK, MIC SELECTOR F/O	1	FLT STA; P15	23–51–09
PANEL – JACK, MIC SELECTOR F/E	1	FLT STA; P13	23–51–10
TRANSCEIVER – VHF COMM	3	FESC; REAR RACK; 112AB	23–23–01

*SEE WM EQUIPMENT LIST

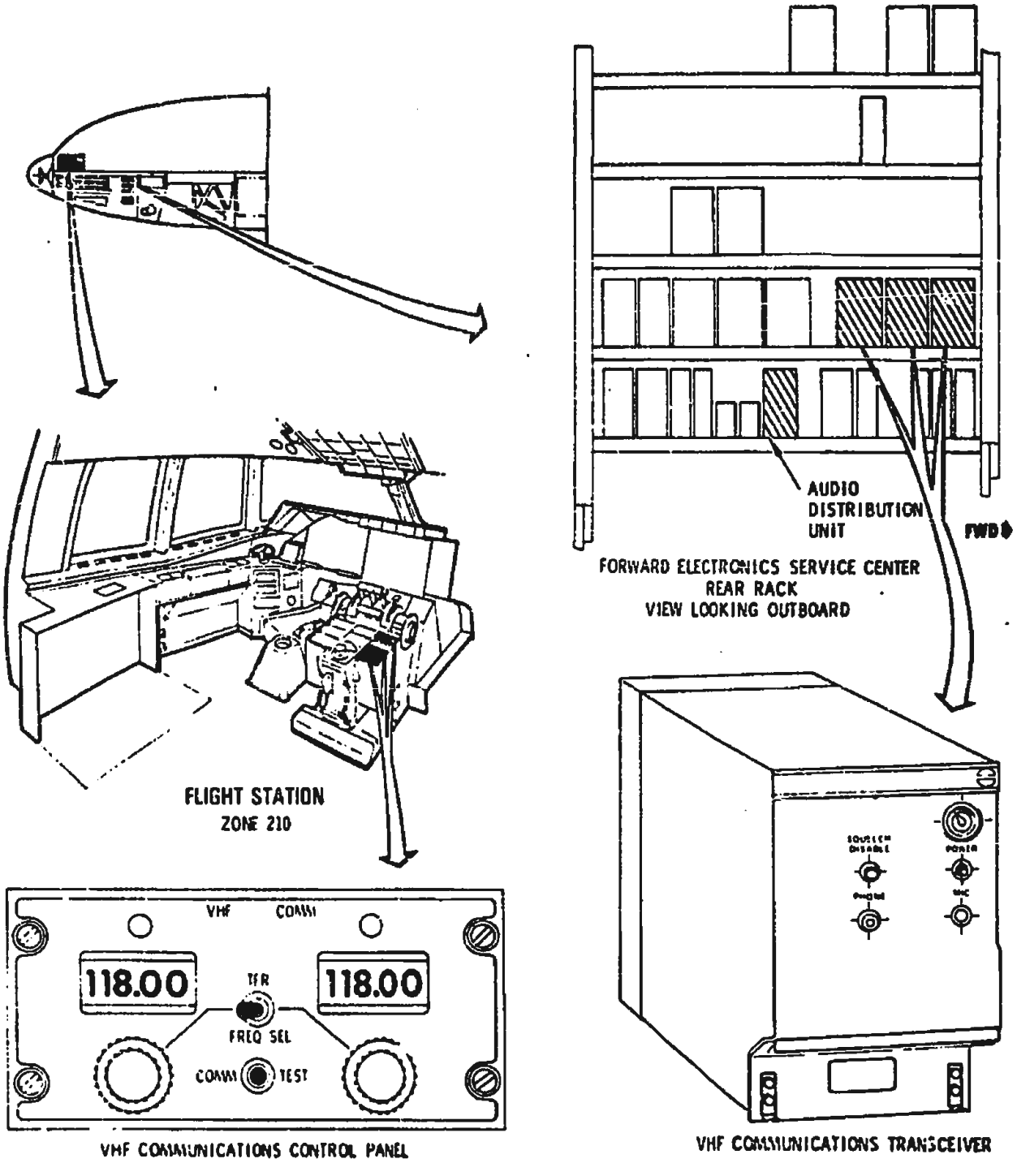
M1–0001–23–1209

R
R

Component Location Index
Figure 101

EFFECTIVITY: ALL

0018



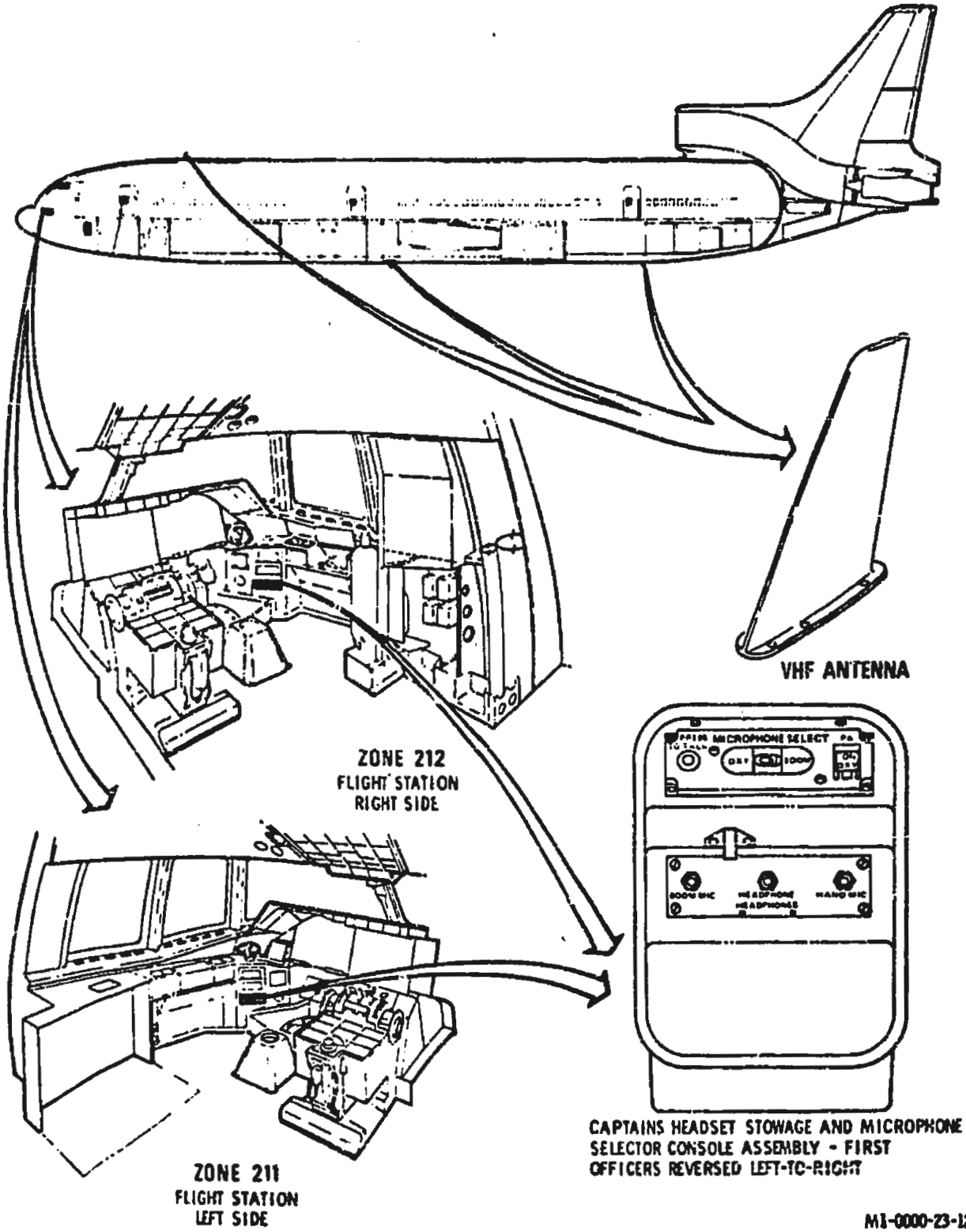
M1-0000-23-1212

R
R

Component Locator Diagram
Figure 102 (Sheet 1)

R
R
001B

EFFECTIVITY: ALL



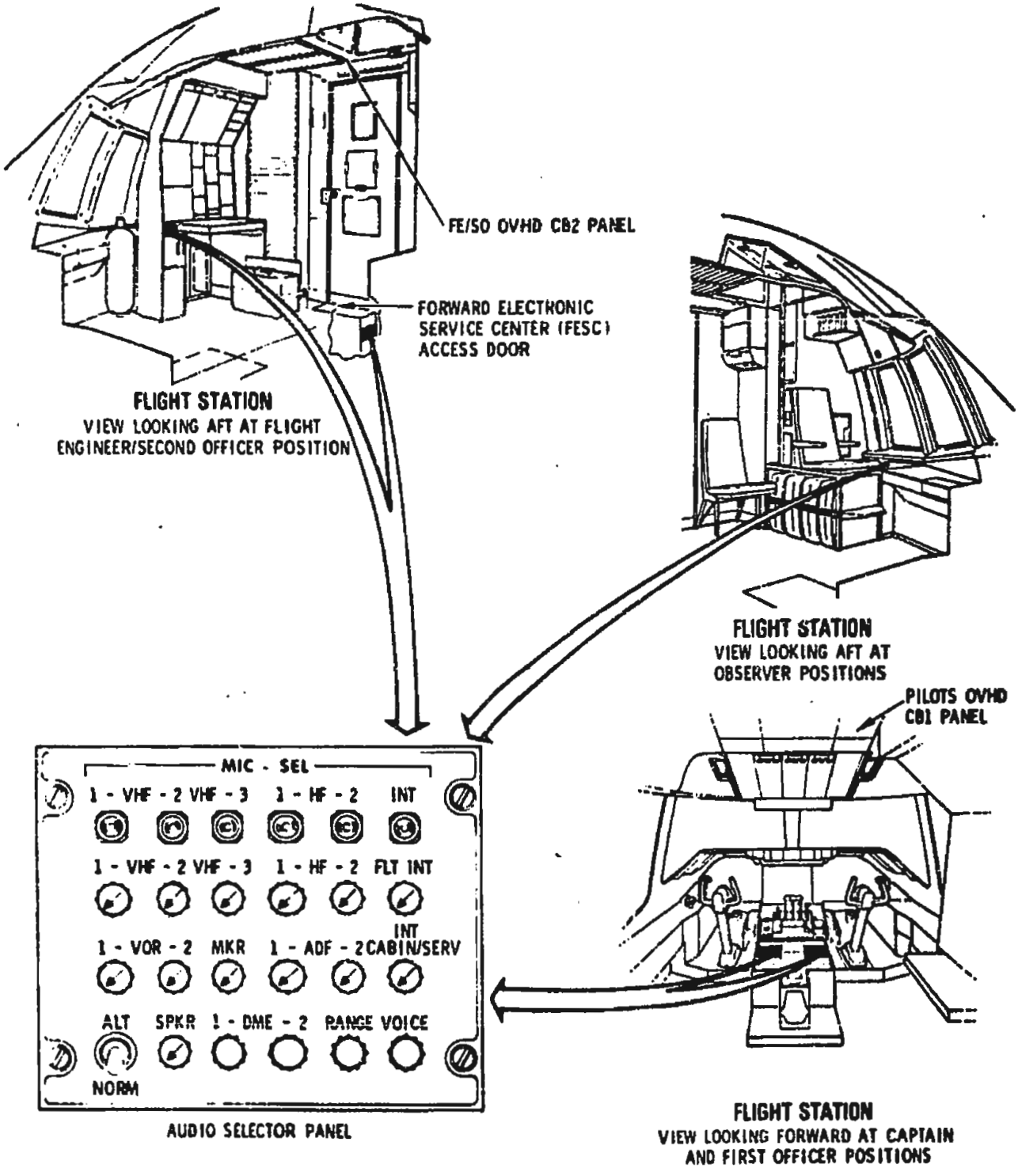
R
R

Component Locator Diagram
Figure 102 (Sheet 2)

R
R
R

EFFECTIVITY: ALL

0016

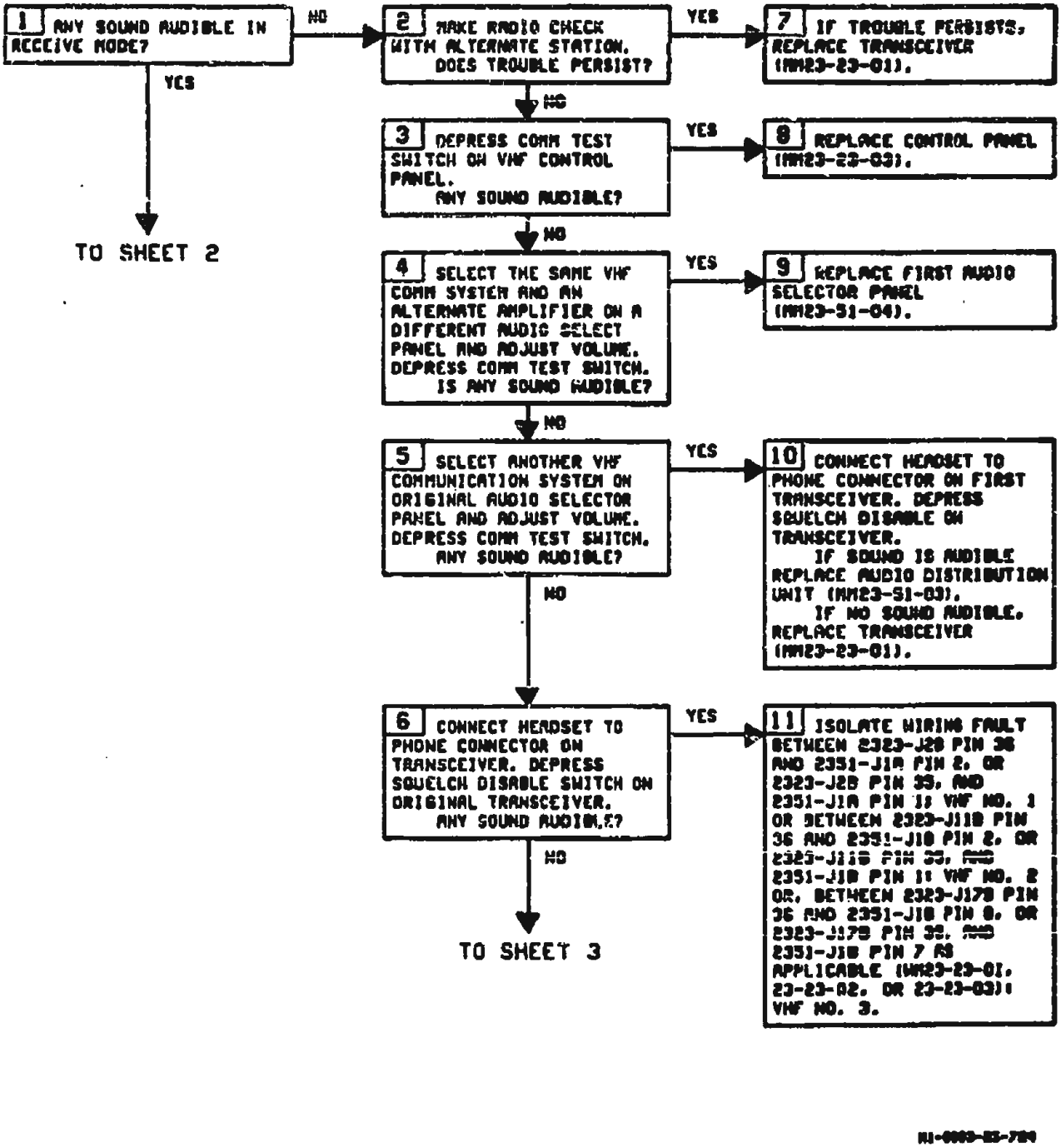

FE/SO OVHD CB2 PANEL
FORWARD ELECTRONIC SERVICE CENTER (FESC) ACCESS DOOR
FLIGHT STATION
VIEW LOOKING AFT AT FLIGHT ENGINEER/SECOND OFFICER POSITION
FLIGHT STATION
VIEW LOOKING AFT AT OBSERVER POSITIONS
PILOTS OVHD CB1 PANEL
MIC - SEL
1 - VHF - 2 VHF - 3 1 - HF - 2 INT
1 - VHF - 2 VHF - 3 1 - HF - 2 FLT INT
INT
1 - VOR - 2 MKR 1 - ADF - 2 CABIN/SERV
ALT SPKR 1 - DME - 2 RANGE VOICE
NORM
AUDIO SELECTOR PANEL
FLIGHT STATION
VIEW LOOKING FORWARD AT CAPTAIN AND FIRST OFFICER POSITIONS

M1-0000-23-1236

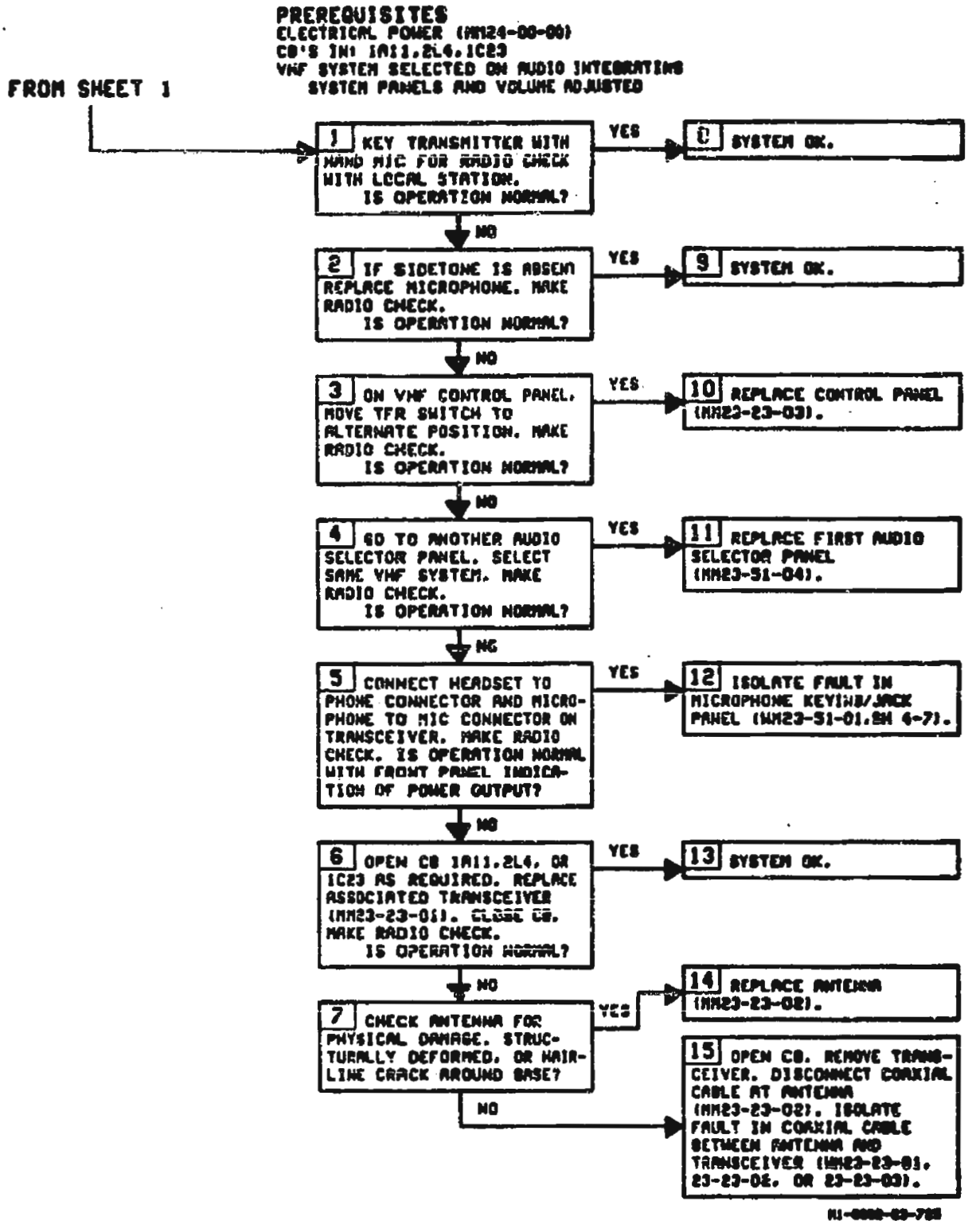
R R Component Locator Diagram
Figure 102 (Sheet 3)

R R 001B EFFECTIVITY: ALL

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A11, 2L4, 1CP3
VHF SYSTEM SELECTED ON AUDIO INTEGRATING SYSTEM PANELS AND VOLUME ADJUSTED


1 ANY SOUND AUDIBLE IN RECEIVE MODE?
NO
YES
TO SHEET 2
2 MAKE RADIO CHECK WITH ALTERNATE STATION. DOES TROUBLE PERSIST?
YES
7 IF TROUBLE PERSISTS, REPLACE TRANSCEIVER (MM23-23-01).
NO
3 DEPRESS COMM TEST SWITCH ON VHF CONTROL PANEL. ANY SOUND AUDIBLE?
YES
8 REPLACE CONTROL PANEL (MM23-23-03).
NO
4 SELECT THE SAME VHF COMM SYSTEM AND AN ALTERNATE AMPLIFIER ON A DIFFERENT AUDIO SELECT PANEL AND ADJUST VOLUME. DEPRESS COMM TEST SWITCH. IS ANY SOUND AUDIBLE?
YES
9 REPLACE FIRST AUDIO SELECTOR PANEL (MM23-31-04).
NO
5 SELECT ANOTHER VHF COMMUNICATION SYSTEM ON ORIGINAL AUDIO SELECTOR PANEL AND ADJUST VOLUME. DEPRESS COMM TEST SWITCH. ANY SOUND AUDIBLE?
YES
10 CONNECT HEADSET TO PHONE CONNECTOR ON FIRST TRANSCEIVER. DEPRESS SQUELCH DISABLE ON TRANSCEIVER. IF SOUND IS AUDIBLE REPLACE AUDIO DISTRIBUTION UNIT (MM23-31-03). IF NO SOUND AUDIBLE, REPLACE TRANSCEIVER (MM23-23-01).
NO
6 CONNECT HEADSET TO PHONE CONNECTOR ON TRANSCEIVER. DEPRESS SQUELCH DISABLE SWITCH ON ORIGINAL TRANSCEIVER. ANY SOUND AUDIBLE?
YES
11 ISOLATE WIRING FAULT BETWEEN 2323-J2B PIN 36 AND 2351-J1A PIN 2, OR 2323-J2B PIN 35, AND 2351-J1A PIN 1; VHF NO. 1 OR BETWEEN 2323-J11B PIN 36 AND 2351-J1B PIN 2, OR 2323-J11B PIN 35, AND 2351-J1B PIN 1; VHF NO. 2 OR, BETWEEN 2323-J17B PIN 36 AND 2351-J1B PIN 8, OR 2323-J17B PIN 35, AND 2351-J1B PIN 7 AS APPLICABLE (MM23-23-01, 23-23-02, OR 23-23-03); VHF NO. 3.
NO
TO SHEET 3

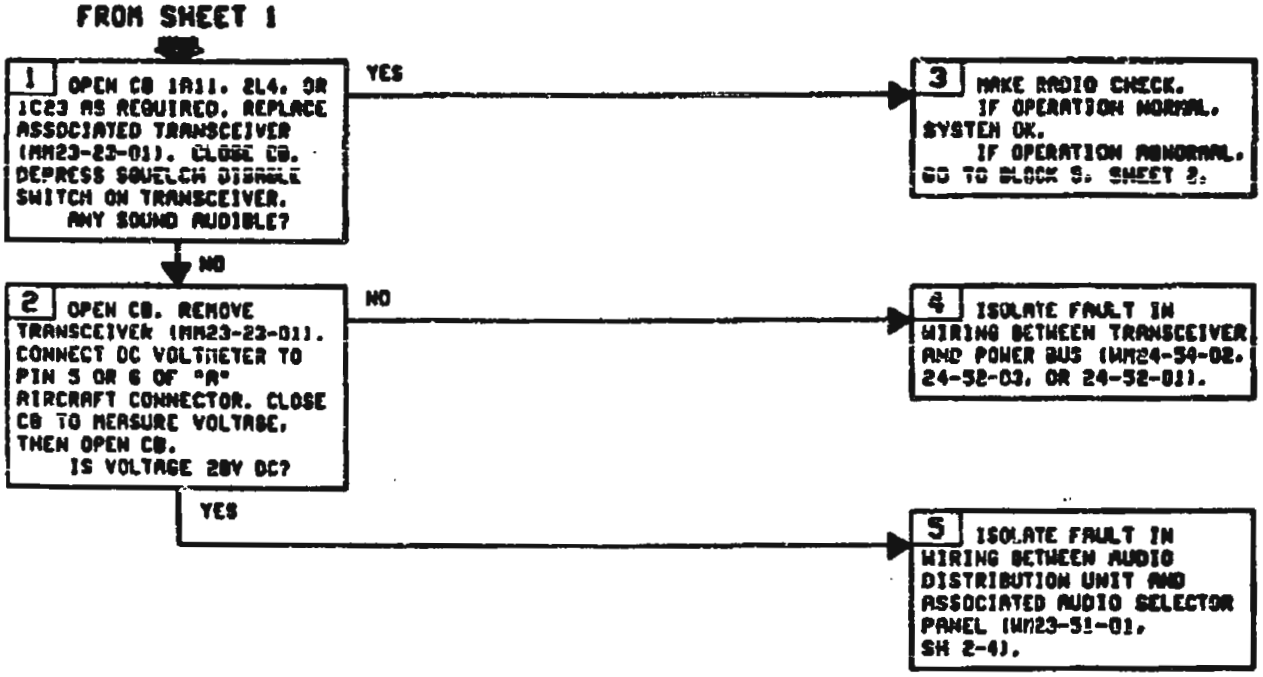
R VHF Communication System Fault Isolation
R Figure 103 (Sheet 1)


PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A11,2L4,1C23
VHF SYSTEM SELECTED ON AUDIO INTEGRATING SYSTEM PANELS AND VOLUME ADJUSTED
FROM SHEET 1
1 KEY TRANSMITTER WITH HAND MIC FOR RADIO CHECK WITH LOCAL STATION. IS OPERATION NORMAL?
YES
8 SYSTEM OK.
NO
2 IF SIDETONE IS ABSENT REPLACE MICROPHONE. MAKE RADIO CHECK. IS OPERATION NORMAL?
YES
9 SYSTEM OK.
NO
3 ON VHF CONTROL PANEL, MOVE TFR SWITCH TO ALTERNATE POSITION. MAKE RADIO CHECK. IS OPERATION NORMAL?
YES
10 REPLACE CONTROL PANEL (MM23-23-03).
NO
4 GO TO ANOTHER AUDIO SELECTOR PANEL. SELECT SAME VHF SYSTEM. MAKE RADIO CHECK. IS OPERATION NORMAL?
YES
11 REPLACE FIRST AUDIO SELECTOR PANEL (MM23-51-04).
NO
5 CONNECT HEADSET TO PHONE CONNECTOR AND MICROPHONE TO MIC CONNECTOR ON TRANSCEIVER. MAKE RADIO CHECK. IS OPERATION NORMAL WITH FRONT PANEL INDICATION OF POWER OUTPUT?
YES
12 ISOLATE FAULT IN MICROPHONE KEYING/JACK PANEL (MM23-51-01,SH 6-7).
NO
6 OPEN CB 1A11,2L4, OR 1C23 AS REQUIRED. REPLACE ASSOCIATED TRANSCEIVER (MM23-23-01). CLOSE CB. MAKE RADIO CHECK. IS OPERATION NORMAL?
YES
13 SYSTEM OK.
NO
7 CHECK ANTENNA FOR PHYSICAL DAMAGE. STRUCTURALLY DEFORMED, OR HAIRLINE CRACK AROUND BASE?
YES
14 REPLACE ANTENNA (MM23-23-02).
NO
15 OPEN CB. REMOVE TRANSCEIVER. DISCONNECT COAXIAL CABLE AT ANTENNA (MM23-23-02). ISOLATE FAULT IN COAXIAL CABLE BETWEEN ANTENNA AND TRANSCEIVER (MM23-23-01, 23-23-02, OR 23-23-03).

R VHF Communication System Fault Isolation
R Figure 103 (Sheet 2)

R EFFECTIVITY: ALL
R
0018

PREREQUISITES
SEE SHEET 1

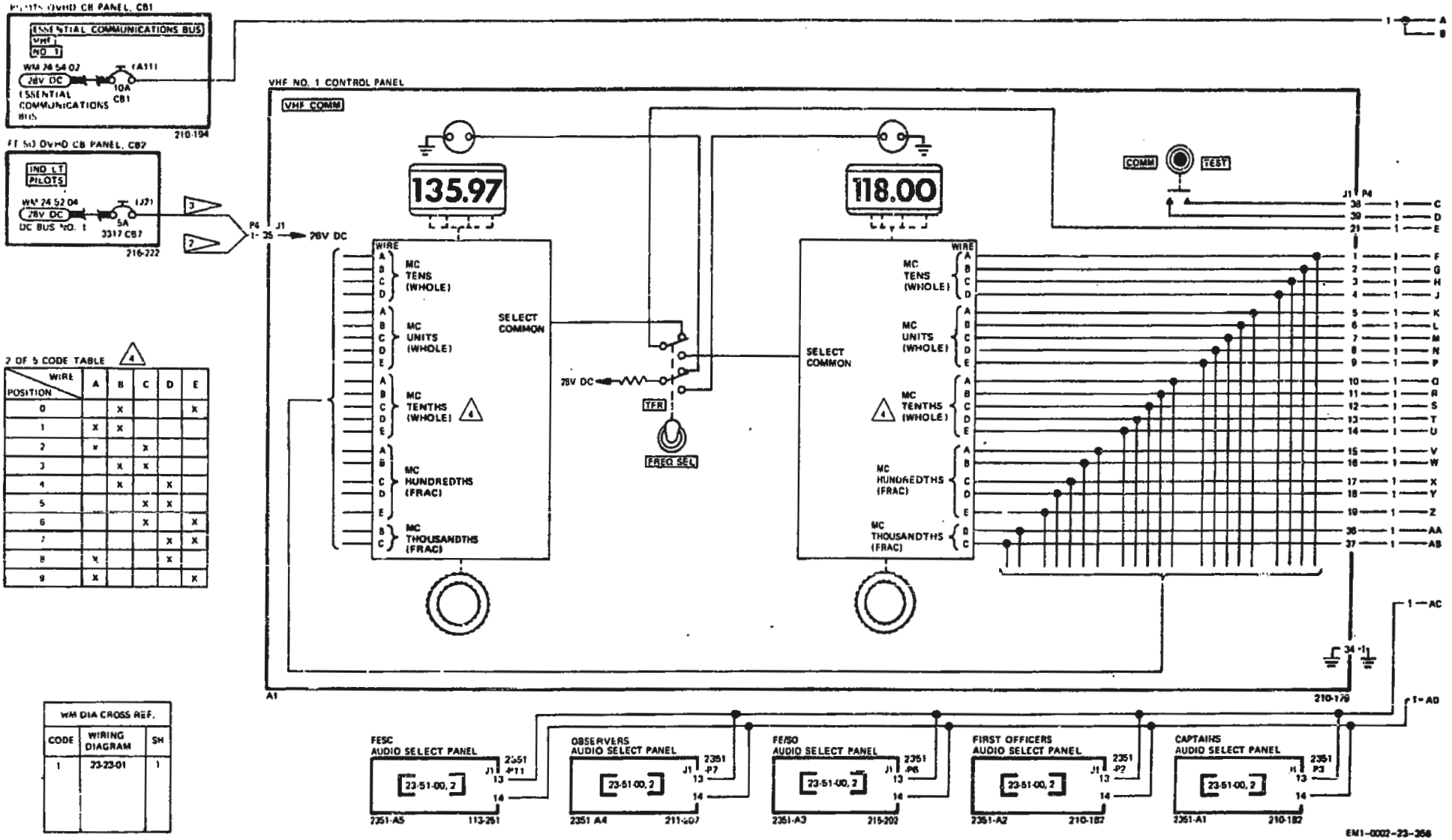

FROM SHEET 1
1 OPEN CB 1A11, 2L4, OR 1C23 AS REQUIRED, REPLACE ASSOCIATED TRANSCEIVER (MM23-23-01). CLOSE CB. DEPRESS SQUELCH DISABLE SWITCH ON TRANSCEIVER. ANY SOUND AUDIBLE?
YES
3 MAKE RADIO CHECK. IF OPERATION NORMAL, SYSTEM OK. IF OPERATION ABNORMAL, GO TO BLOCK 6, SHEET 2.
NO
2 OPEN CB. REMOVE TRANSCEIVER (MM23-23-01). CONNECT DC VOLTMETER TO PIN 5 OR 6 OF "A" AIRCRAFT CONNECTOR. CLOSE CB TO MEASURE VOLTAGE, THEN OPEN CB. IS VOLTAGE 28V DC?
NO
4 ISOLATE FAULT IN WIRING BETWEEN TRANSCEIVER AND POWER BUS (MM24-54-02, 24-52-03, OR 24-52-01).
YES
5 ISOLATE FAULT IN WIRING BETWEEN AUDIO DISTRIBUTION UNIT AND ASSOCIATED AUDIO SELECTOR PANEL (MM23-51-01, SH 2-4).

RJ-0000-03-1404

R R VHF Communication System Fault Isolation
Figure 103 (Sheet 3)

R R EFFECTIVITY: ALL

0018



2 OF 5 CODE TABLE

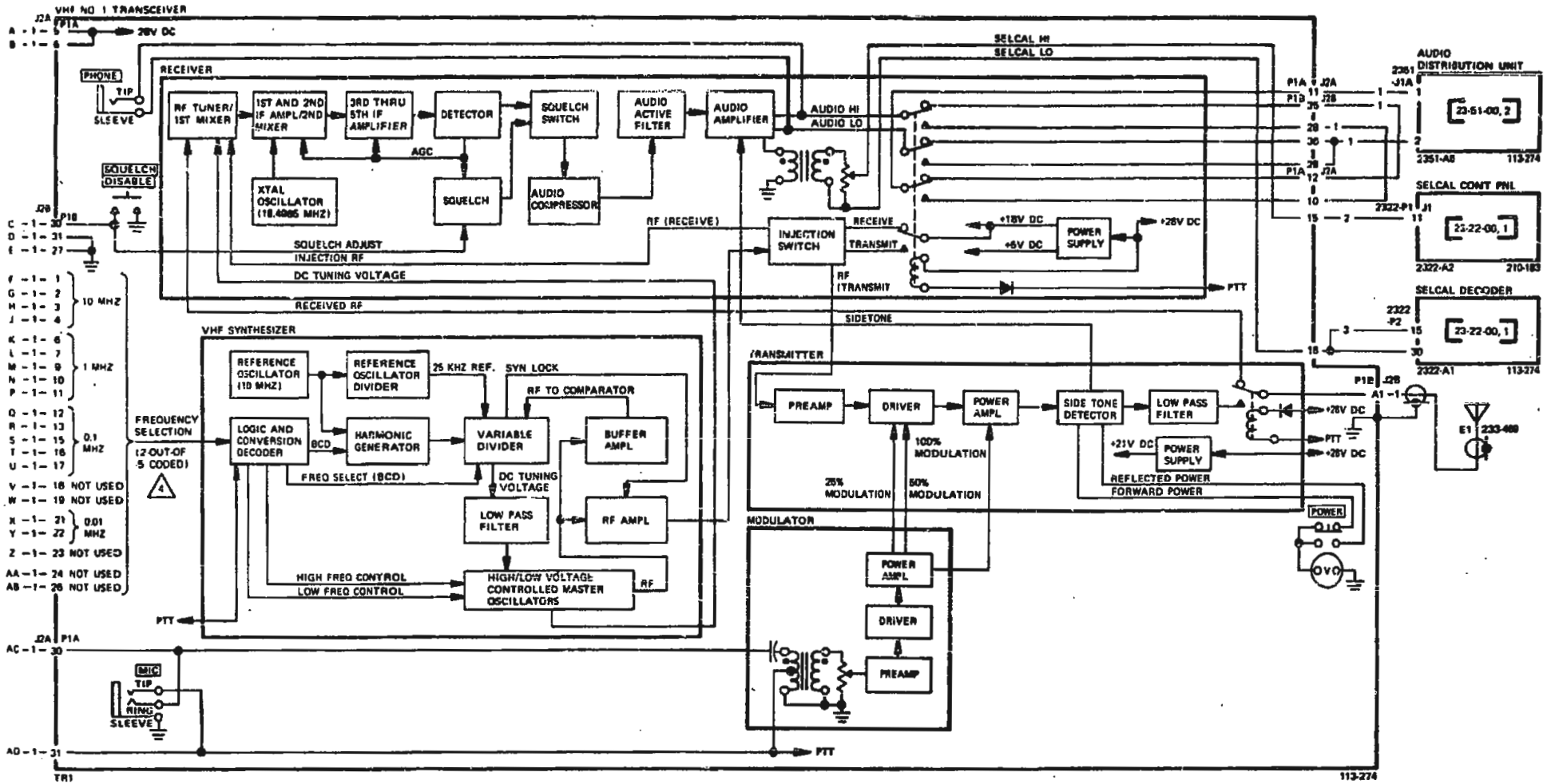
POSITION \ WIRE	A	B	C	D	E
0		X			X
1	X	X			
2	X		X		
3		X	X		
4		X		X	
5			X	X	
6			X		X
7				X	X
8	X			X	
9	X				X

WM DIA CROSS REF.		
CODE	WIRING DIAGRAM	SH
1	23-23-01	1

R VHF Communication System No. 1 Schematic
R SCHEM 1 (Sheet 1)

EFFECTIVITY: ALL

0018



WM DIA. CROSS REF.

CODE	WIRING DIA.	SH
1	23-23-01	2
2	23-22-01	1
3	23-22-01	2

NOTE

ALL REF. DESIGNATIONS ARE PREFIXED WITH 2323 UNLESS OTHERWISE SPECIFIED

2 AIRCRAFT 001 TO CAPTAINS BRIGHT/DIM BUS NO. 5

3 AIRCRAFT 002-999

4 WIRES CONNECTED TO SELECT COMMON PER 2 OF 5 CODE TABLE (SHEET 1)

5 NONSTANDARD ABBREVIATIONS
MHZ – MEGAHERTZ
PTT – PUSH TO TALK
BCD – BINARY CODED DECIMAL

6 [23-51-00, 2] = CROSS REF. TO WM SCHEM/MM FIG. IN DIFFERENT ATA NO.

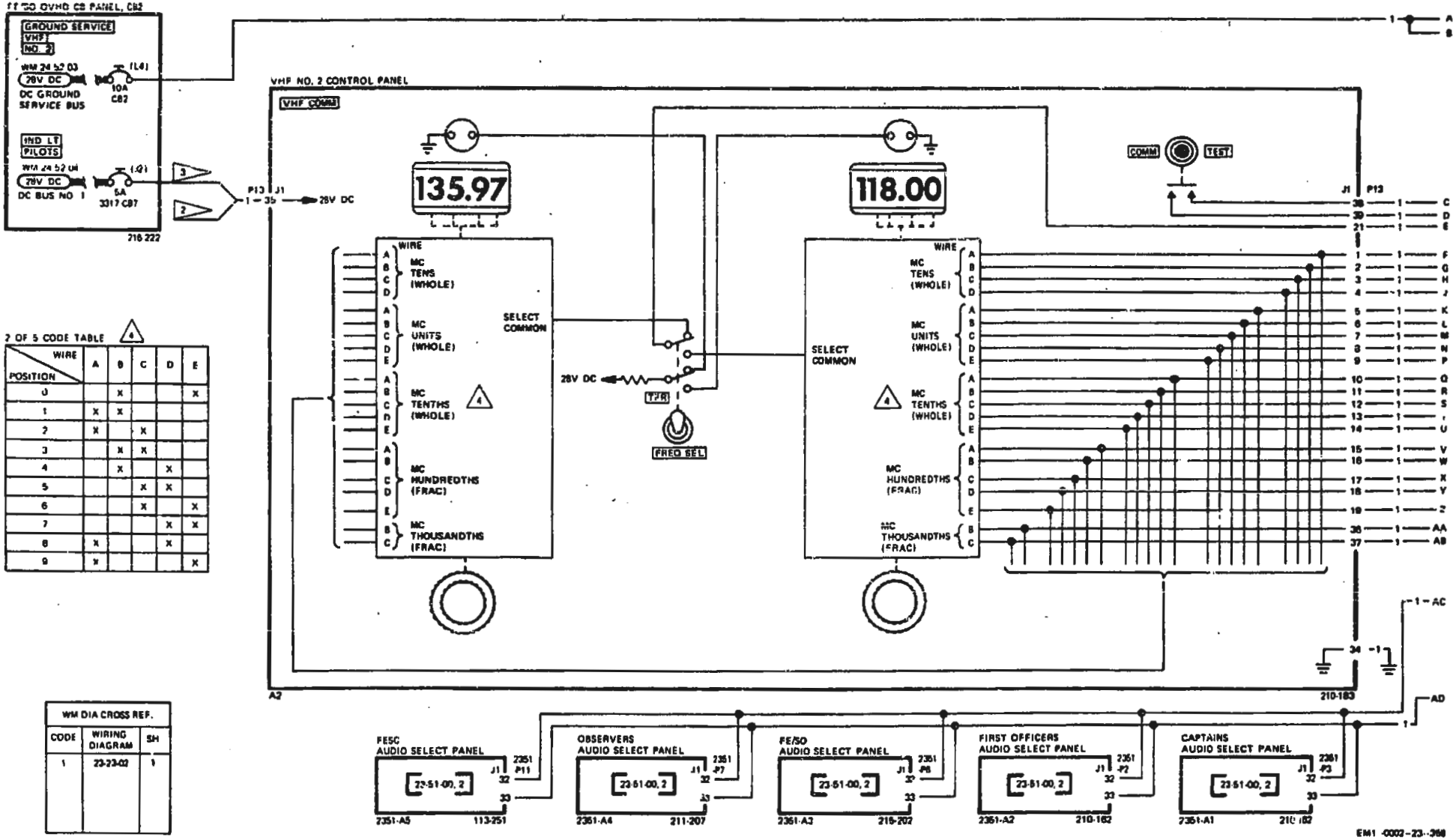
7 1 NO. IN WIRE PROVIDES CODE FOR WIRING DIAGRAM CROSS REF. TABLE

EM1-0002-23-357

CR VHF Communication System No. 1 Schematic
CR SCHEM 1 (Sheet 2)

EFFECTIVITY: ALL

001B



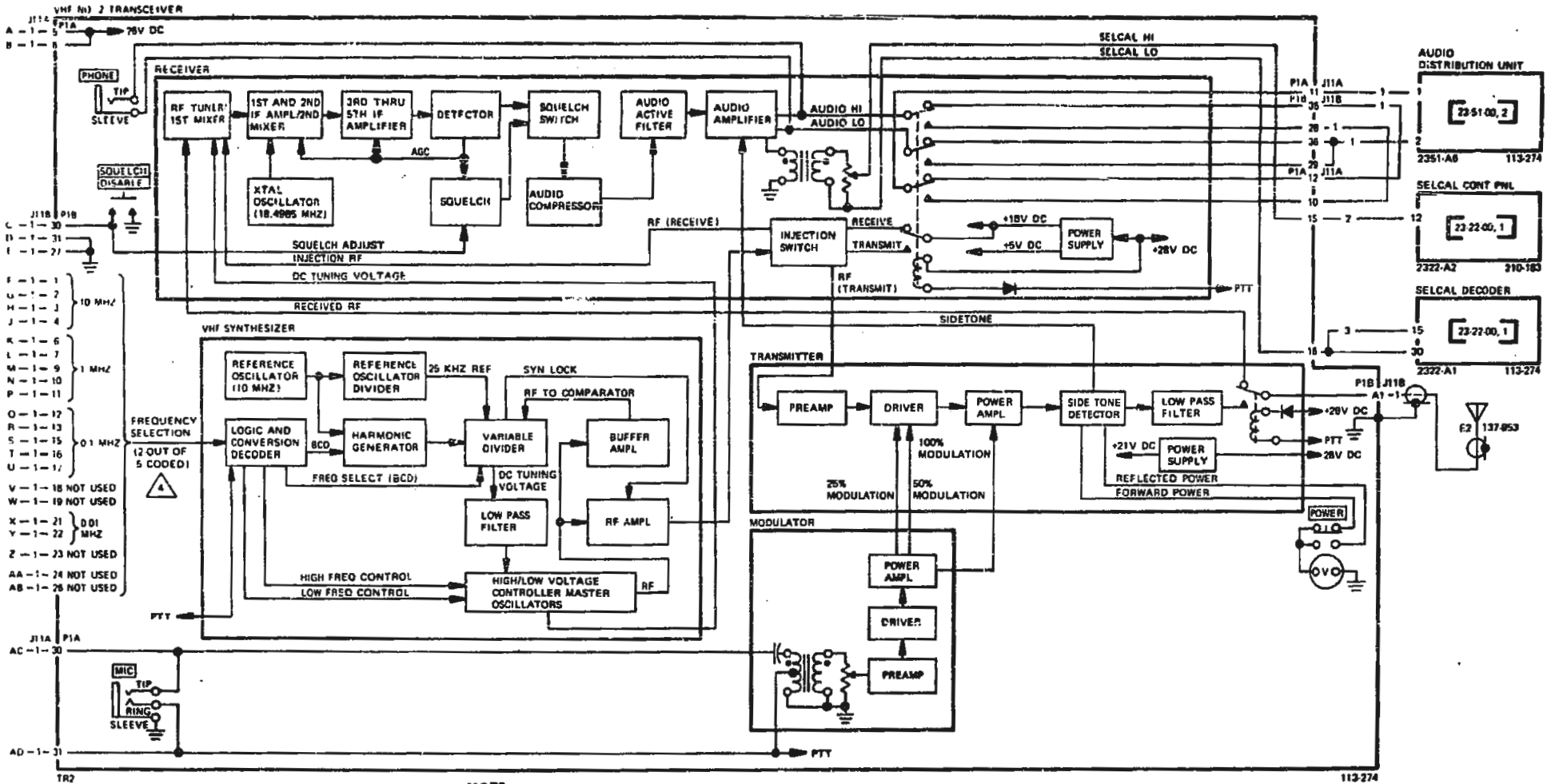
2 OF 5 CODE TABLE

WIRE / POSITION	A	B	C	D	E
0		X			X
1	X	X			
2	X		X		
3		X	X		
4		X		X	
5			X	X	
6			X		X
7				X	X
8	X			X	
9	X				X

WM DIA CROSS REF.		
CODE	WIRING DIAGRAM	SH
1	23-23-02	1

R VHF Communication System No. 2 Schematic
R SCHEM 2 (Sheet 1)

EFFECTIVITY: ALL



WM DIA CROSS REF.

CODE	WIRING DIA.	SH
1	23-73-02	2
2	23-22-01	1
3	23-72-01	2

NOTE

1. ALL REF. DESIGNATIONS ARE PREFIXED WITH 2323 UNLESS OTHERWISE SPECIFIED
2. AIRCRAFT 001 TO CAPTAINS BRIGHT/DIM BUS NO. 5
3. AIRCRAFT 002-999
4. WIRES CONNECTED TO SELECT COMMON PER 2 OF 5 CODE TABLE (SHEET 1)
5. NONSTANDARD ABBREVIATIONS
   MHZ – MEGAHERTZ
   PTT – PUSH TO TALK
   BCD – BINARY CODED DECIMAL
6. 23-51-00, 2 = CROSS REF. TO WM SCHEM/MM FIG. IN DIFFERENT ATA NO.
7. NO. IN WIRE PROVIDES CODE FOR WIRING DIAGRAM CROSS REF. TABLE

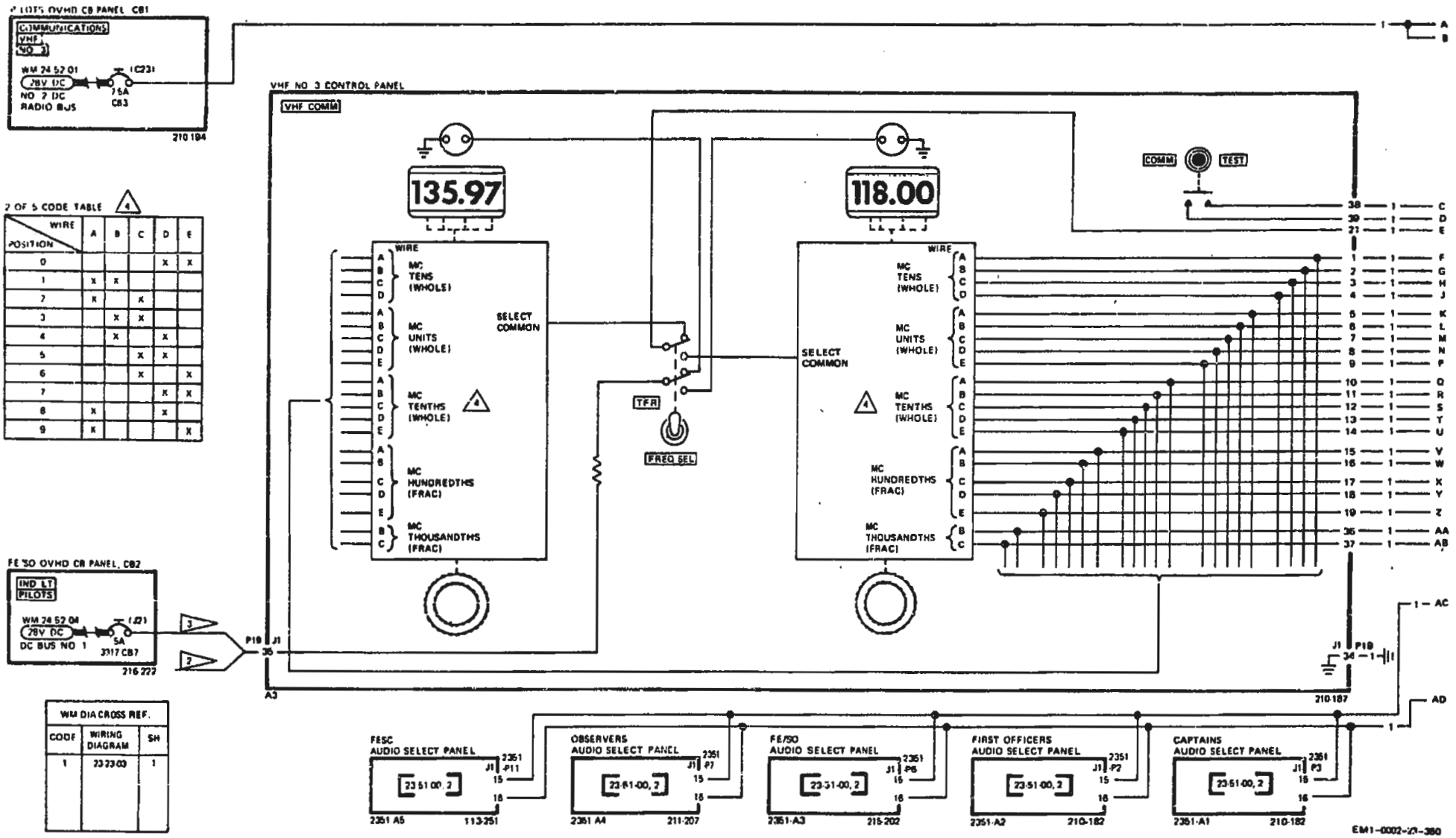
EM1-0002-23-.59

CR
CR

VHF Communication System No. 2 Schematic
SCHEM 2 (Sheet 2)

EFFECTIVITY: ALL

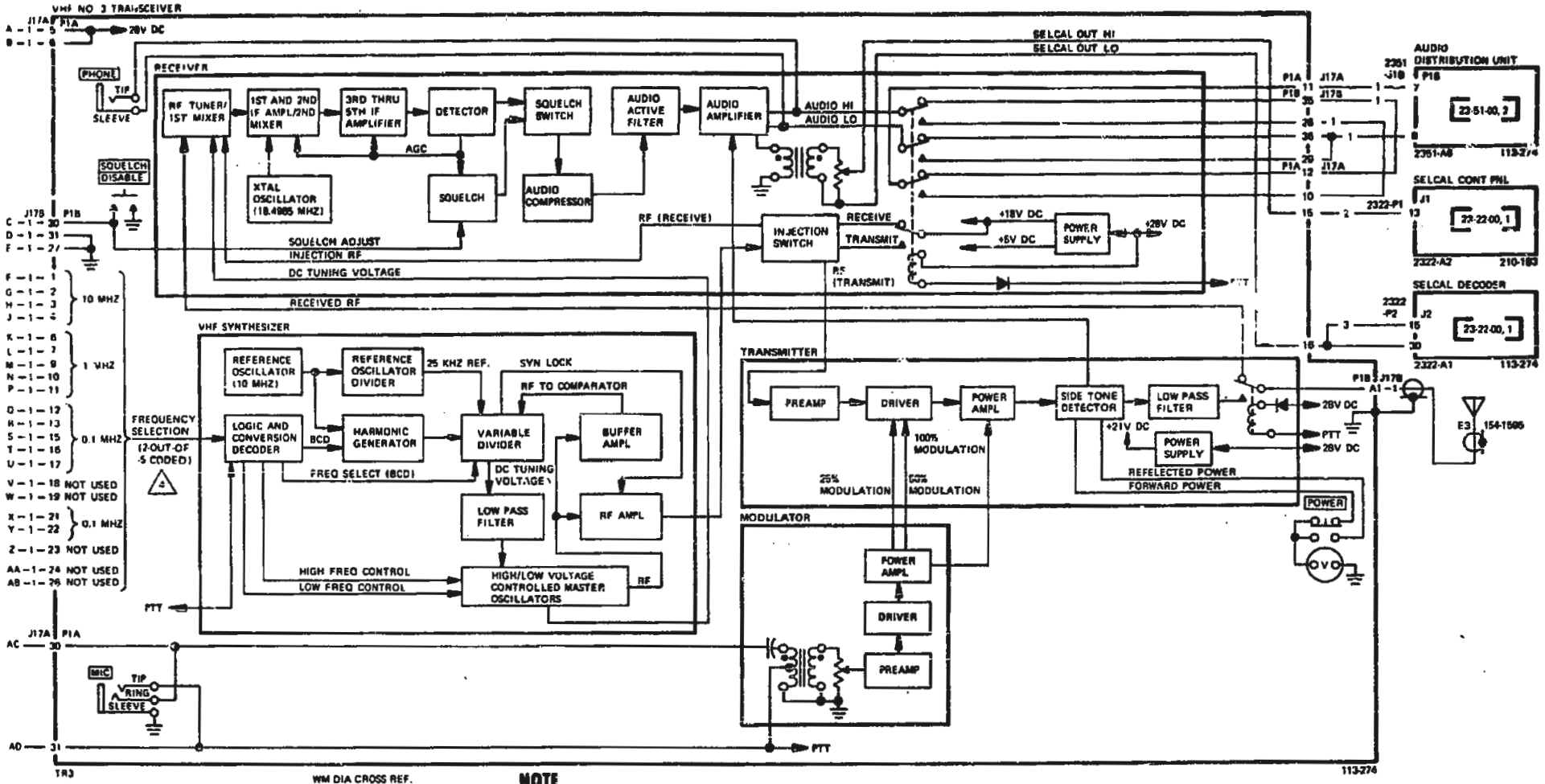
001B



R VHF Communication System No. 3 Schematic
R SCHEM 3 (Sheet 1)

EFFECTIVITY: ALL

001B



WM DIA CROSS REF.

CODE	WIRING DIAGRAM	SH
1	23-23-03	2
2	23-22-01	1
3	23-22-01	2

NOTE

1. ALL REF. DESIGNATIONS ARE PREFIXED WITH 2323 UNLESS OTHERWISE SPECIFIED
2. AIRCRAFT 001 TO CAPTAINS BRIGHT/DIM BUS NO. 5
3. AIRCRAFT 002-999
4. WIRES CONNECTED TO SELECT COMMON PER 2 OF 5 CODE TABLE (SHEET 1)
5. NONSTANDARD ABBREVIATIONS
   MHZ – MEGAHERTZ
   PTT – PUSH TO TALK
   BCD – BINARY CODED DECIMAL
6. [23-51-00, 2] – CROSS REF. TO WM SCHEM/MM FIG. IN DIFFERENT ATA NO.
7. —1— NO. IN WIRE PROVIDES CODE FOR WIRING DIAGRAM CROSS REF. TABLE

EM1-0002-23-251

CR VHF Communication System No. 3 Schematic
CR SCHEM 3 (Sheet 2)

EFFECTIVITY: ALL

001B

VHF COMMUNICATION - MAINTENANCE PRACTICES

1. General

One transmitter and two independent communications receivers are required for all operations. The following procedure specifies the method to deactivate a transmitter if aircraft is to be dispatched with one unit inoperative.

2. Maintenance Practices

R NOTE: This deactivation procedure applies only when an aircraft
R is to be dispatched in accordance with the MEL.

A. Deactivation

(1) Open and collar the following circuit breakers as appropriate:

Pilots overhead circuit breaker panel CB1, ESSENTIAL COMMUNICATIONS BUS - VHF NO. 1 (A11).

FE/SO circuit breaker panel CB2, GROUND SERVICE - VHF NO. 2 (L4).

Pilots overhead circuit breaker panel CB1, COMMUNICATION - VHF NO. 3 (C23).

(2) Placard affected VHF COMM panel on center console.

(3) Make appropriate entry in aircraft log book.

VHF COMMUNICATION SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-22-00 SELCAL System - Adjustment and Test

23-51-00 Audio Integrating System - Adjustment and Test

24-00-00 Electrical Power - Maintenance Practices

2. Adjustment/Test

A. BITE Test

(1) Turn on electrical power (Ref. 24-00-00).

(2) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS
R BUS - VHF NO. 1 (A11), and COMMUNICATION - VHF NO. 3 (C23) are closed.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breaker GROUND SERVICE - VHF NO. 2 (L4) is closed.

On pilots overhead panel, zone 210, verify that MASTER RADIO - ESSENTIAL and NO. 2 switchlights are depressed.

(3) On the pilots center console at VHF No. 1, No. 2, and No. 3 control panels, select authorized control tower or maintenance test frequencies.

(4) In forward electronic service center at rear rack, connect a headset at the PHONE jack and a hand-held
R microphone at the MIC jack on VHF transceiver No. 1 front panel.

Depress SQUELCH DISABLE switch.

Verify that noise level in headset increases.

(5) Key microphone and observe POWER meter on transceiver front panel. Hold microphone keyed and depress POWER switch while observing meter.

CR Verify that with microphone keyed, meter reads six or
CR more, and when POWER switch is depressed, meter reading
CR is less than three.

CR Release POWER switch and microphone key.

R (6) Repeat Steps 2A(4) and (5) for VHF No. 2 and No. 3.

(7) Disconnect headset and microphone.

R (8) Turn off electrical power (Ref. 24-00-00).

B. Operational Test

(1) Turn on electrical power (Ref. 24-00-00).

R (2) Verify that audio integrating system is turned on (Ref.
R 23-51-00).

(3) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS
R BUS - VHF NO. 1 (A11), and COMMUNICATION - VHF NO. 3 (C23) are closed.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breaker GROUND SERVICE - VHF NO. 2 (L4) is closed.

On pilots overhead panel, zone 210, verify that MASTER RADIO - ESSENTIAL and NO. 2 switchlights are depressed.

R (4) On the pilots center console at VHF No. 1, No. 2, and No. 3 control panels, select authorized control tower or maintenance test frequencies in both windows of each panel. If permitted by local regulations, different frequencies should be selected on each control head.

The following frequencies will test all aircraft
R frequency control wiring and each major section of the
R VHF transceiver synthesizer. They can be used if permitted by local regulations.

118.00 MHz	127.52 MHz
121.12 MHz	129.65 MHz
122.25 MHz	130.77 MHz
124.37 MHz	133.80 MHz
126.40 MHz	135.95 MHz

(5) In forward electronic service center (FESC), connect a hand-held microphone and a headset at the jack panel under the audio selector panel. On the audio selector panel, depress VHF 1, 2, and 3 audio input switches, and turn to adjust audio level as necessary. On the
R front panel of each VHF transceiver, depress SQUELCH DISABLE switch.

Verify that noise level in headset increases.

(6) On audio selector panel, depress MIC SEL VHF 1. Key microphone and observe POWER meter on front panel of VHF transceiver No. 1. Hold microphone keyed and depress POWER switch on transceiver while observing meter.

Verify that with microphone keyed, meter reads six or more and when POWER switch is depressed, meter reading is less than three.

Release POWER switch and microphone key.

Repeat for VHF transceiver No. 2 and No. 3. Verify that light comes on when microphone is keyed, and flickers when speaking into microphone.

Release all FESC audio selector panel MIC SEL and audio input switches.

(7) In flight station at Captains position, depress audio selector panel MIC SEL VHF 1, and VHF 1 audio input switches. Listen on Captains headset, and turn audio input switch to adjust audio level as necessary. On VHF No. 1 control panel, depress COMM TEST.

Verify that receiver noise increases.

NOTE: If desired, the following test can be combined with the SELCAL operational test (Ref. 23-22-00).

(8) Key Captains hand-held microphone and call control tower or test station for radio check.

Verify that transmission and reception are loud and clear.

(9) Switch VHF No. 1 control panel TFR FREQ SEL switch to other position and call control tower or test station for radio check.

Verify that transmission and reception are loud and clear.

(10) Repeat Steps (7), (8), and (9) for VHF No. 2 at Captains position, and for VHF No. 1 and No. 2 at First Officers position.

(11) At Flight Engineer/Second Officers position, repeat Steps (7), (8), and (9) for VHF No. 3.

(12) Stow all headsets and microphones.

R (13) Turn off electrical power (Ref. 24-00-00).

VHF TRANSCEIVER - REMOVAL AND INSTALLATION

1. Referenced Procedure

23-23-00 VHF Communication System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) To remove VHF-1 or VHF-3 transceiver, On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATIONS BUS - VHF NO. 1 (A11) or COMMUNICATION - VHF NO. 3 (C23), as applicable.

To remove VHF-2 transceiver, On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - VHF NO. 2 (L4).

(2) In forward electronic service center, zone 113, locate transceiver at rear avionics rack (Ref. Fig. 401).

R (3) Loosen knurled thumbscrews and disengage from mounting brackets at front of transceiver, then remove transceiver.

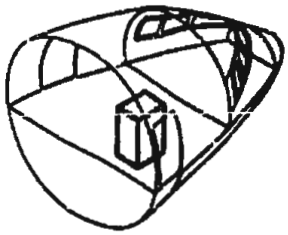
B. Installation

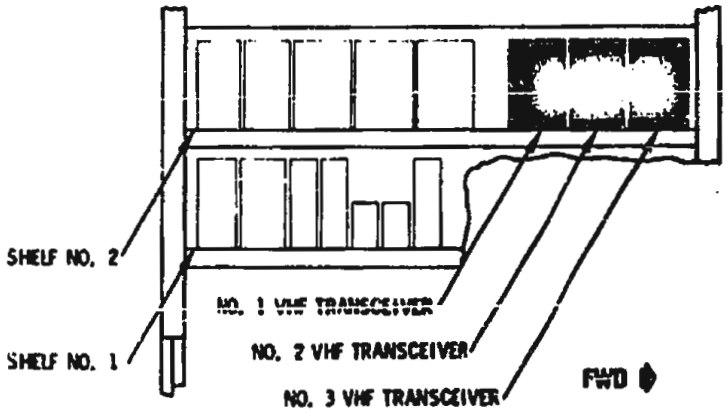
(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Slide transceiver into rear avionics rack until rear connector is engaged. Engage thumbscrews on mounting brackets at front of transceiver and tighten (Ref. Fig. 401).

(3) Remove tag(s) and close circuit breaker(s) opened in Step 2A(1).

R (4) Perform BITE test of VHF system for which transceiver was replaced (Ref. 23-23-00).





(8)
FORWARD ELECTRONICS SERVICE CENTER
(REAR RACK - VIEW LOOKING OUTBOARD)

M1-5601-23-250

R
R VHF Transceivers - Removal and Installation
Figure 401

ANTENNA - REMOVAL AND INSTALLATION

1. Equipment and Materials

Soft clean rags

Two size 8-32 screws, 1 to 2 inches long

Plastic scraper

Solvent, Methyl-Ethyl-Ketone (MEK), Federal Specification TT-M-261, or equivalent

Solvent, Toluene, Federal Specification T-T-548, or equivalent

Tape, Teflon, MIL-I-23594, or equivalent

Solvent, Trichloroethane, Fed Spec O-T-620 1,1,1 or
C Corrosion Inhibiter, LPS-3 spray canEnvironmental Sealant, (LAC
C Spec C-40-1279, Mfr P/N PR1436G-B2, TWA Stk Nbr 50-1188)O-ring,
C PN NAS 1593-132, or equivalent

Electrical tie cord

2. Referenced Procedure

23-23-00 VHF Communication System - Adjustment and Test

CR 3. Top VHF Antenna - Deletion of Anti-icing

CR A. General

CR (1) Due to deletion of the top VHF antenna anti-icing
CR system on Aircraft 31032 through 31036 (as delivered)
CR and deletion of the sytem on the rest of the L-1011
CR fleet by modification order, a VHF antenna
CR interchangeability problem exists.

CR (2) The top (No. 1) VHF antenna without anti-icing has the
CR vent duct hole in the antenna tip filled with sealant.
CR Spare P/N 271-0005 antennas are not sealed.

CR (3) Removed antennas of this type, when received in the
CR Radio shop, will also have sealant applied to the vent
CR hole in the antenna base to prevent entry of fluids if
CR the antenna is mounted on the bottom two positions (VHF
CR Nos. 2 and 3).

C B. Replacement of No. 1 VHF Antenna

C (1) When replacing a No. 1 VHF antenna, the following
C procedures must be used, as applicable:

C (a) Aircraft WITHOUT anti-icing:

C NOTE: Aircraft with anti-icing deleted may be
C identified readily by the absence of a VHF
C ANT circuit breaker in row D of the F/E's
C overhead circuit breaker panel CB-2.

C 1 If the replacement antenna has the tip vent
C sealed, install the antenna.

C 2 If the replacement antenna DOES NOT have the
C tip sealed, use a dowell wrapped with a cloth
C saturated with MEK and clean the tip vent to a
C depth of at least one inch. When dry, fill the
C vent hole to a depth of approximately one inch
C with PR1436GB2 sealant, Stk. Nbr. 50-1186, and
C smooth to the tip contour.

C CAUTION: SHOULD AN ANTENNA WITHOUT A SEALED TIP
C VENT BE INSTALLED ON AIRCRAFT 31032
C THROUGH 31036, RAIN ENTERING THE ANTENNA
C WILL FREEZE AT ALTITUDE OR IN LOW
C TEMPERATURES AND BURST THE ANTENNA,
C LEADING TO AN INOPERATIVE VHF SYSTEM AND
C POSSIBLE FOREIGN OBJECT DAMAGE TO THE
C NO. 2 ENGINE.

CR 3 Install the antenna.

C 4. Removal/Installation

A. Removal

(1) To remove VHF No. 1 or No. 3 antenna,
On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATION BUS - VHF NO. 1 (A11) for VHF No. 1 transceiver system or COMMUNICATION - VHF NO. 3 (C23) for VHF No. 3 transceiver system.

To remove VHF No. 2 antenna,
On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - VHF No. 2 (L4).

(2) Remove bolts securing antenna to fuselage structure (Ref. Fig. 401 for VHF No. 1 antenna; Fig 402 for VHF No. 2 antenna; and Fig. 403 for VHF No. 3 antenna).

(3) Break fillet seal around base of antenna and lift antenna until coax connector is exposed. If seal does not break easily by hand pressure, insert 8-32 screws in two threaded jacking screw holes in rear of antenna base. Tighten screws evenly to break fillet seal. Remove screws.

R (4) Cut tie cord, unwrap teflon tape from coax connector, and disconnect coax connector. Remove antenna.

WARNING: USE METHYL-ETHYL-KETONE (MEK) IN WELL-VENTILATED AREA. AVOID FLUID CONTACT WITH SKIN AND EYES. PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE IRRITATION.

KEEP MEK AWAY FROM HEAT, SPARKS AND OPEN FLAME. FAILURE TO COMPLY MAY RESULT IN MATERIAL COMBUSTION.

R (5) Use plastic scraper to remove sealant from fuselage structure. Use a soft clean rag moistened with MEK solvent to wipe fuselage structure clean. Do not allow solvent to air dry; wipe dry with a clean dry rag.

B. Installation

(1) Verify that applicable circuit breakers opened in Step 3A(1) are open and tagged.

WARNING: USE TRICHLOROETHANE IN WELL-VENTILATED AREA. DO NOT INHALE VAPOR, AND AVOID FLUID CONTACT WITH SKIN. PROLONGED EXPOSURE MAY RESULT IN UNCONSCIOUSNESS OR LUNG OR SKIN IRRITATION.

(2) Use clean soft rag moistened with trichloroethane solvent to clean faying surfaces of fuselage structure and antenna base for electrical bond. Before cleaning solvent dries, use a clean rag and wipe dry.

(3) Install new O-ring around hole in fuselage structure for antenna connector (Ref. Fig. 401 for VHF No. 1 antenna; Fig. 402 for VHF No. 2 antenna; and Fig. 403 for VHF No. 3 antenna).

(4) Connect coax connector to plug on base of antenna.

WARNING: USE TOLUENE IN WELL-VENTILATED AREA. DO NOT INHALE VAPOR AND AVOID FLUID CONTACT WITH SKIN AND EYES. PROLONGED EXPOSURE MAY RESULT IN HEADACHE, DIZZINESS, NAUSEA, OR SKIN OR EYE IRRITATION.

KEEP TOLUENE AWAY FROM HEAT, SPARKS AND OPEN FLAME. FAILURE TO COMPLY MAY RESULT IN MATERIAL COMBUSTION.

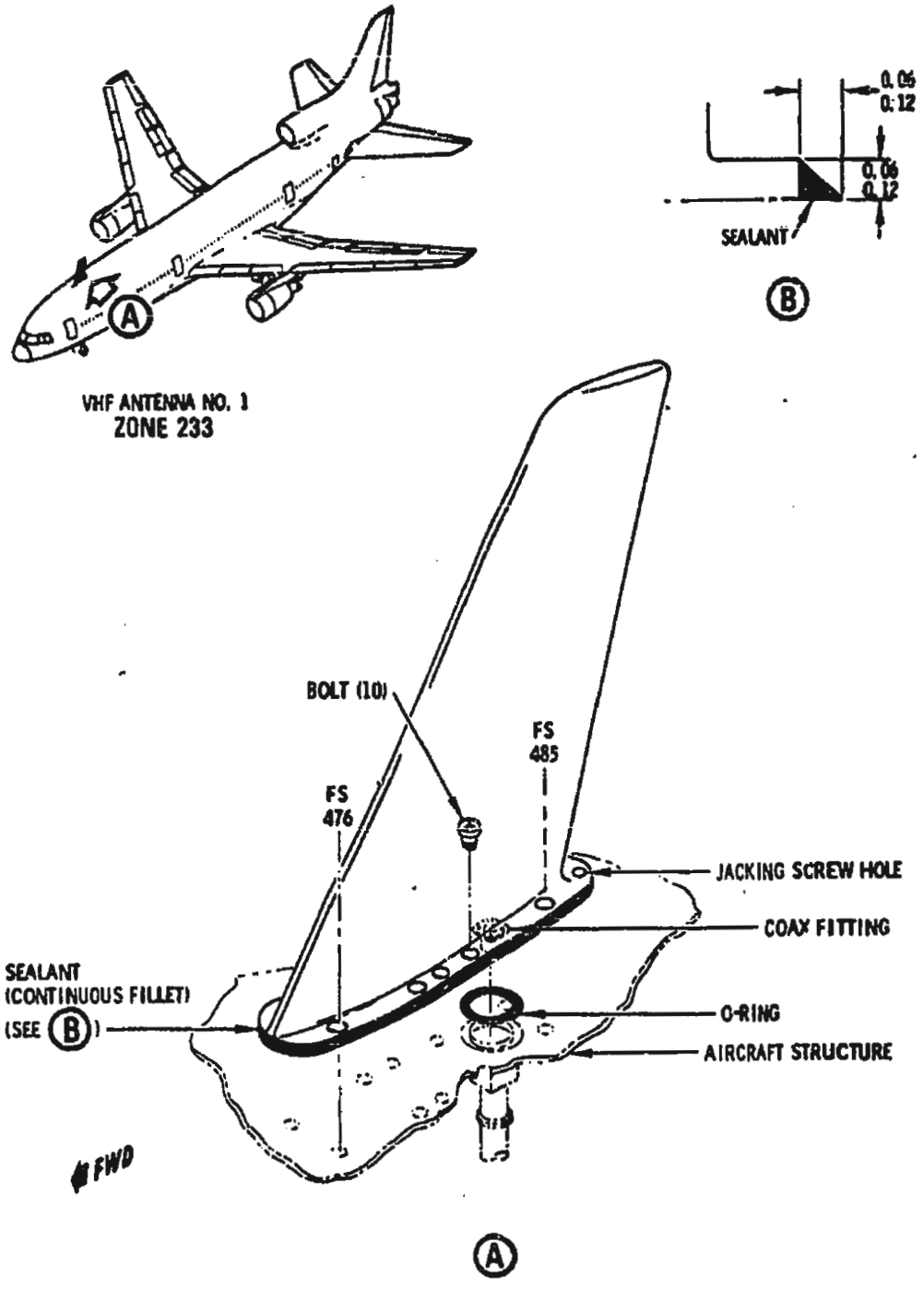
(5) Clean coax connector surface with clean cloth moistened with Toluene solvent. Wrap connector with teflon tape (two wraps minimum), using slight tension until last wrap; use no tension on last wrap. Tie tape with tie cord.

R R (6) Remove tags and close applicable circuit breakers opened in Step 3A(1).

R (7) Perform BITE test of system for which antenna was replaced (Ref. 23-23-00).

WARNING: DO NOT ALLOW SEALANT TO CONTACT SKIN OR EYES. PROLONGED EXPOSURE MAY RESULT IN SKIN OR EYE IRRITATION.

(9) Apply a continuous sealant fillet between antenna base and aircraft structure (Ref. applicable Fig. 401, 402, or 403).



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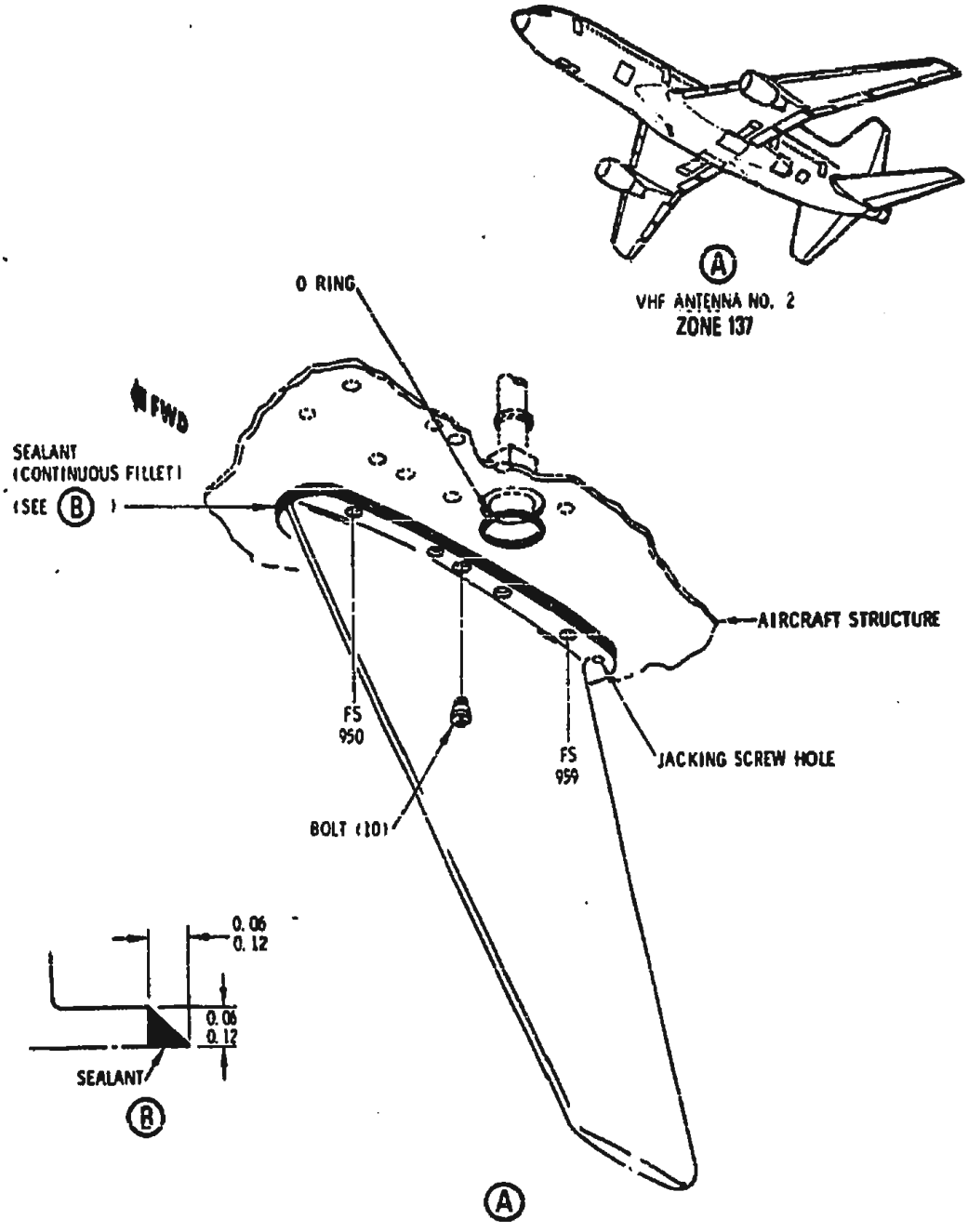
VHF Antenna No. 1 - Removal and Installation
Figure 401



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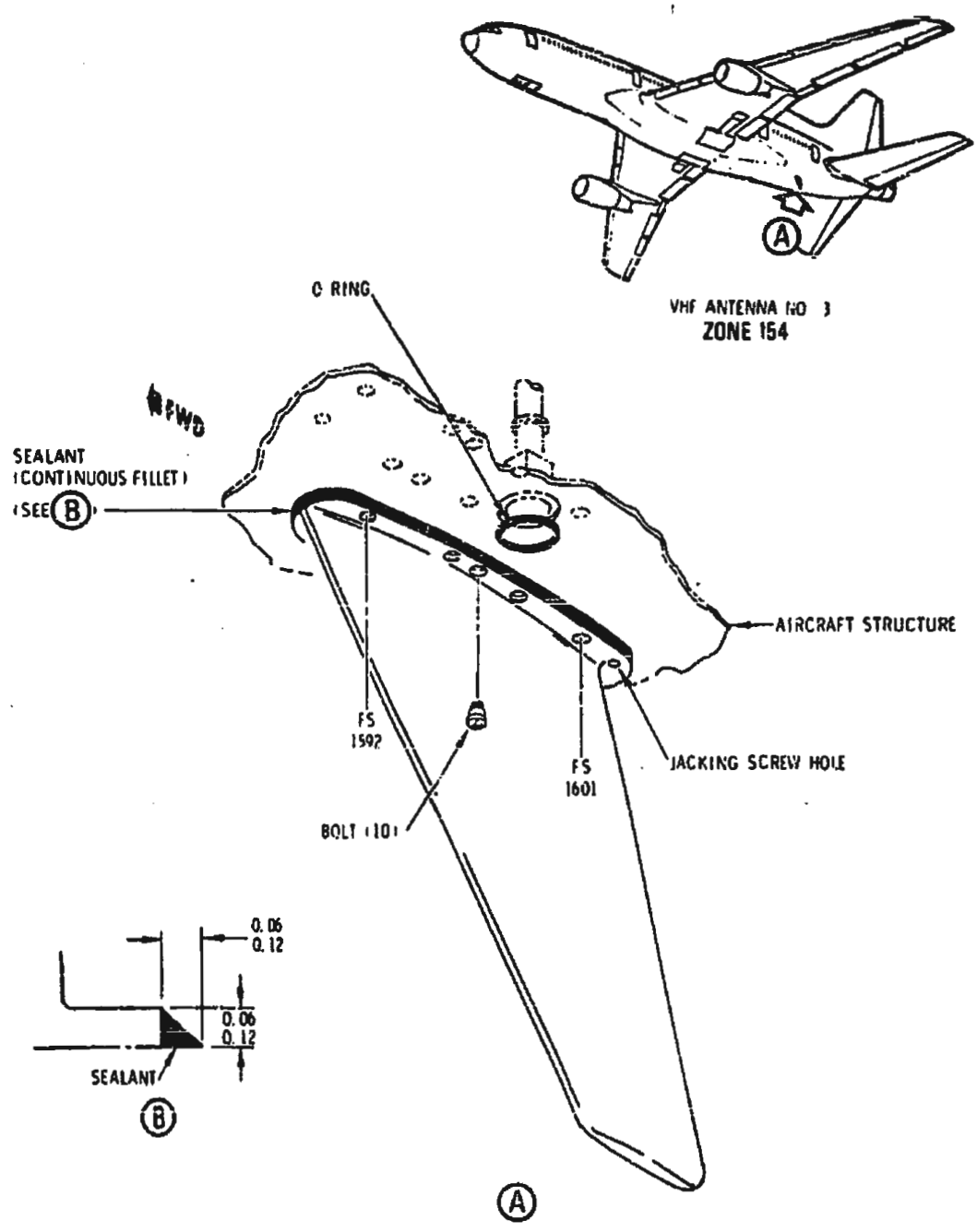
VHF Antenna No. 2 - Removal and Installation
Figure 402



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VHF Antenna No. 3 - Removal and Installation
Figure 403

CR VHF COMMUNICATIONS ANTENNA - ADJUSTMENT/TEST

CR 1. Functional/Test - VHF System Antenna and Transmitter Power
CR Output

CR A. General

CR (1) This procedure is to be followed during VHF System
CR Functional/Test or when normal performance and/or
CR trouble shooting procedures indicate that the
CR transmitter power output is low or that the antenna
CR system is malfunctioning.

CR (2) Prior to performing the tests described herein, power
CR must be supplied to the VHF systems according to
CR standard procedures.

CR (3) The tests are to be conducted where no surrounding
CR objects will affect the VHF antennas on the aircraft.

CR B. Test Equipment Required

CR (1) Wheatstone bridge, R & R 90113.

CR (2) EQ758 VSWR Kit (includes R & R 90159 VSWR Kit and R & R
CR 90149 field strength meter.)

CR NOTE: On aircraft equipped with Collins 618M-2B
CR Transceivers the 618M-2B "R-PWR" meter function
CR shall NOT be used for these tests in lieu of the
CR R & R 90159 VSWR Kit.

CR C. Test Transmitter Output and Antenna System

CR (1) Disconnect the No. 1, No. 2, and No. 3 VHF transmission
CR lines at the co-axial junctions on the radio rack
CR disconnect panel.

CR (2) Using a Wheatstone bridge, check the resistance from
CR antenna base to structure. It must not exceed .005
CR ohm. If this tolerance cannot be met, the antenna must
CR be re-bonded. (See Removal/Installation procedures.)

CR (3) Using applicable R.F. cable, connect the No. 1 VHF
CR transmitter output to the co-axial connector on the
CR left side of the Wattmeter.

CR (4) Using applicable R.F. cable, connect the 50 ohm R.F.
CR load to the coaxial connector on the right side of the
CR wattmeter.

CR (5) Position the 25 watt power element so that the arrow is
CR horizontal pointing to the right.

CR (6) Select a frequency of 125.0 mc on all three VHF
CR systems.

CR (7) Key the No. 1 VHF transmitter and observe the wattmeter
CR indication. Record this power reading.

CR NOTE: The transmitter power output shall be no less
CR than 18 watts.

CR (8) Position the wattmeter power element so that the arrow
CR is horizontal pointing to the left.

CR (9) Key the No. 1 VHF transmitter and observe the wattmeter
CR power indication. The VSWR shall be less than 1.15 to
CR 1 (See Fig 501).

CR (10) Disconnect the co-axial cable from the No. 1 VHF
CR transmitter output connector.

CR (11) Connect the No. 2 VHF transmitter output to the left
CR co-axial connector of the wattmeter, using the
CR appropriate R.F. cable.

CR (12) Position the wattmeter power element so that the arrow
CR is horizontal pointing to the right.

CR (13) Key the No. 2 VHF transmitter and observe the wattmeter
CR power indication. Record this power reading.

CR NOTE: The transmitter power output shall be no less
CR than 18 watts.

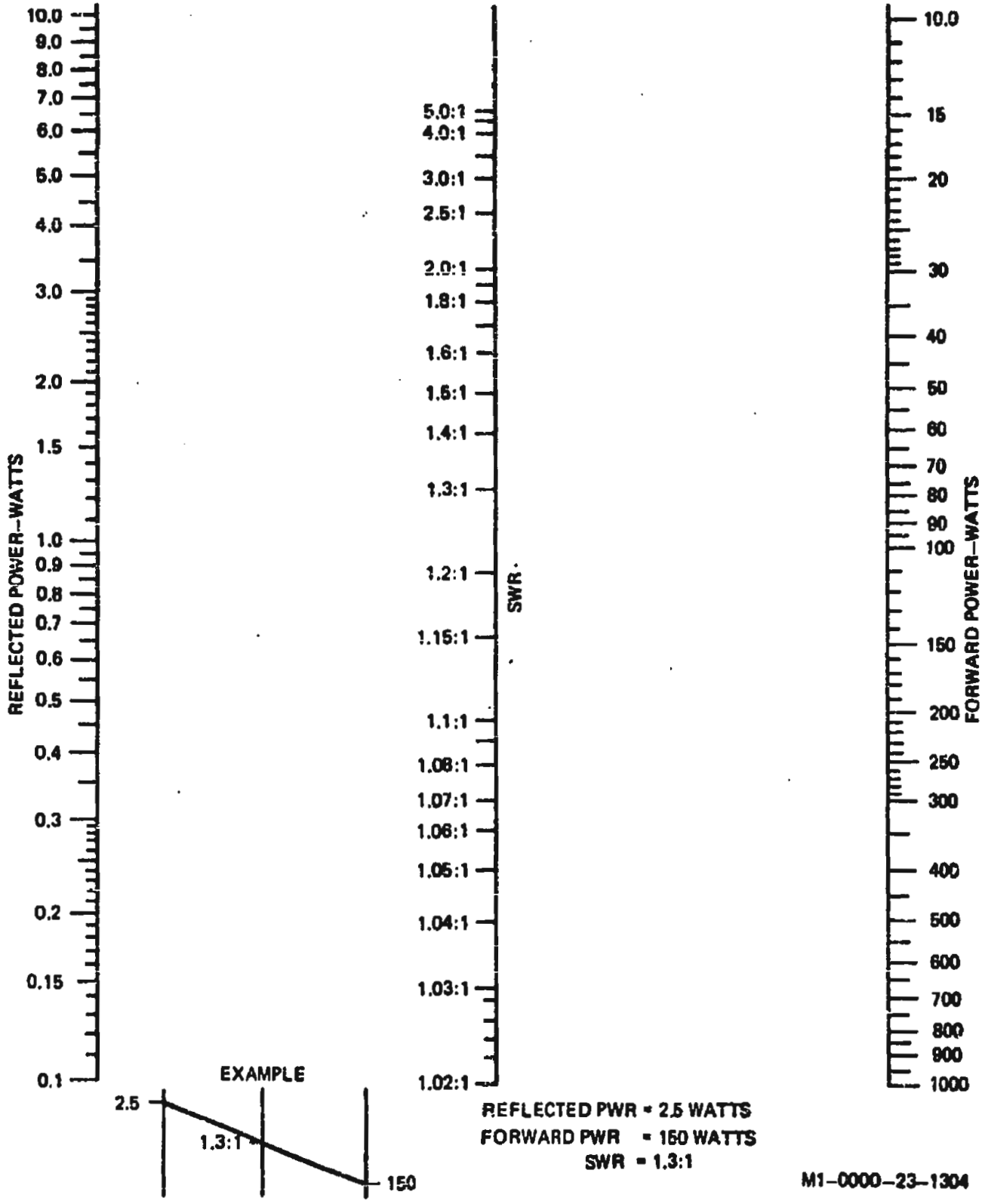
CR (14) Position the wattmeter power element so that the arrow
CR is horizontal pointing to the left.

CR (15) Key the No. 2 VHF transmitter and observe the wattmeter
CR power indication. The VSWR shall be less than 1.15 to
CR 1.

CR (16) Repeat steps (11) through (15) for the No. 3 VHF
CR system.

CR (17) Disconnect the R.F. cable from the No. 2 VHF
CR transmitter output connector.

CR (18) Connect the No. 1 VHF transmitter output to the left
CR co-axial connector of the wattmeter.



CR
CR

VSWR Nomograph
Figure 501

R EFFECTIVITY: ALL
R
001B

CR (19) Remove the 50 ohm load from the right connector of the
CR wattmeter.

CR (20) Connect the No. 1 VHF transmission line to the right
CR connector of the wattmeter.

CR (21) Position the wattmeter power element so the arrow is
CR horizontal pointing to the right.

CR (22) Key the No. 1 VHF transmitter and observe the wattmeter
CR power indication. Record this reading.

CR (23) Place the wattmeter power element arrow so that it is
CR horizontal pointing to the left.

CR (24) Key the No. 1 VHF transmitter and observe the wattmeter
CR power indication. The VSWR shall be less than 2.0 to
CR 1. (See Fig. 501)

CR (25) Position the wattmeter power element so that the power
CR element arrow is horizontal pointing to the right.

CR (26) Remove the No. 1 VHF transmission line from the right
CR connector of the wattmeter.

CR (27) Connect the No. 2 VHF transmission line to the right
CR wattmeter connector.

CR (28) Key the No. 2 VHF transmitter and observe the wattmeter
CR power indication. Record this reading.

CR (29) Place the wattmeter power element arrow so that it is
CR horizontal pointing to the left.

CR (30) Key the No. 2 VHF transmitter and observe the wattmeter
CR power indication. The VSWR shall be less than 2.0 to
CR 1. (Ref. Fig. 501).

CR (31) Remove the No. 2 VHF transmission line from the right
CR connector of the wattmeter.

CR (32) Repeat steps (27) through (30) for the No. 3 VHF.

CR NOTE: If the reflected power readings obtained in
CR Steps (24) and (30) are not within specified
CR limits, the antenna or transmission line is
CR defective. Substitute a known good antenna or
CR the 50 ohm dummy load in the system which is
CR defective, and repeat the tests. If the
CR indications are still beyond limits, the
CR transmission line is defective. If the

CR indications are within the limits, the antenna
CR is defective.

CR (33) Connect the No. 1 VHF, No. 2 VHF, and No. 3 VHF
CR transmission lines to the respective VHF transmitter
CR output connectors on the disconnect panel.

CR (34) Position the wattmeter power element arrow to point
CR vertically prior to transporting the wattmeter.

CR (35) Check that all three systems are operating normally and
CR remove the test equipment from the aircraft.

CR (36) Leave power applied to the VHF systems and proceed with
CR the following tests.

CR D. Check Antenna Connections

CR (1) Obtain the R & R 90149 Field Strength Meter, extend the
CR antenna and set the sensitivity to mid-range. Leave
CR the VHF systems selected to 125.0 mc.

CR (2) With an assistant in the cockpit to key the
CR transmitter, stand under the aircraft approximately
CR half-way between the bottom VHF antennas and have the
CR assistant key the No. 2 VHF transmitter. Adjust the
CR meter sensitivity control for reading of "1" on the
CR "F.S." scale. Have the assistant then unkey No. 2 and
CR key No. 3 VHF. It, also, should read approximately "1"
CR on the F.S. scale.

CR (3) Without changing position or meter sensitivity, have
CR the assistant unkey No. 3 VHF and key No. 1 VHF
CR transmitter.

CR (4) If the antennas are connected to the proper VHF system,
CR the reading now should be considerable less than "1" on
CR the F.S. scale.

CR (5) If the reading in Step (4) is greater than "1", the
CR antenna systems are crossed at the rack disconnect
CR outboard of the rack shelf.

CR (6) Refer to the Wiring Diagram Manual and connect the VHF
CR systems to their proper antennas. If any of the
CR antenna system disconnects are improperly identified,
CR identify them to conform with the Wiring Diagram
CR nomenclature.

CR (7) If necessary to accomplish step (6), recheck VHF
CR systems by repeating steps (1) through (5).

R ANTENNA - INSPECTION AND CHECK

R 1. Equipment and Materials

R Environmental sealant, LAC Spec C-40-1279, or equivalent

R 2. Referenced Procedure

R 51-25-00 L-1011 Structural Repair Manual - Structural
R Sealing

R 3. Inspection/Check

R A. Inspection

R (1) Visually inspect antenna for the following:

R Aerodynamic sealant fillet around base is smooth and
R continuous, with no gaps or voids (Ref. 51-25-00,
R L-1011 Structural Repair Manual). Fill voids as
R required.

R Outside surfaces of antenna are free of dents, cracks,
R or other damage which would disturb the aerodynamic
R shape of the antenna.

VHF CONTROL PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedure

   23-23-00 VHF Communication System - Adjustment and Test

2. Removal/Installation

   A. Removal

      (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATIONS BUS - VHF NO. 1 (A11) for VHF-1 control panel, or COMMUNICATION - VHF NO. 3 (C23) for VHF-3 control panel.

      On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - VHF NO. 2 (L4) for VHF-2 control panel.

      (2) Release mounting fasteners of control panel (VHF No. 1, No. 2, or No. 3, as applicable) on pilots center console, zone 210, (Ref. Fig. 401).

      (3) Lift control panel from pilots center console mount and disconnect connector from back.

   B. Installation

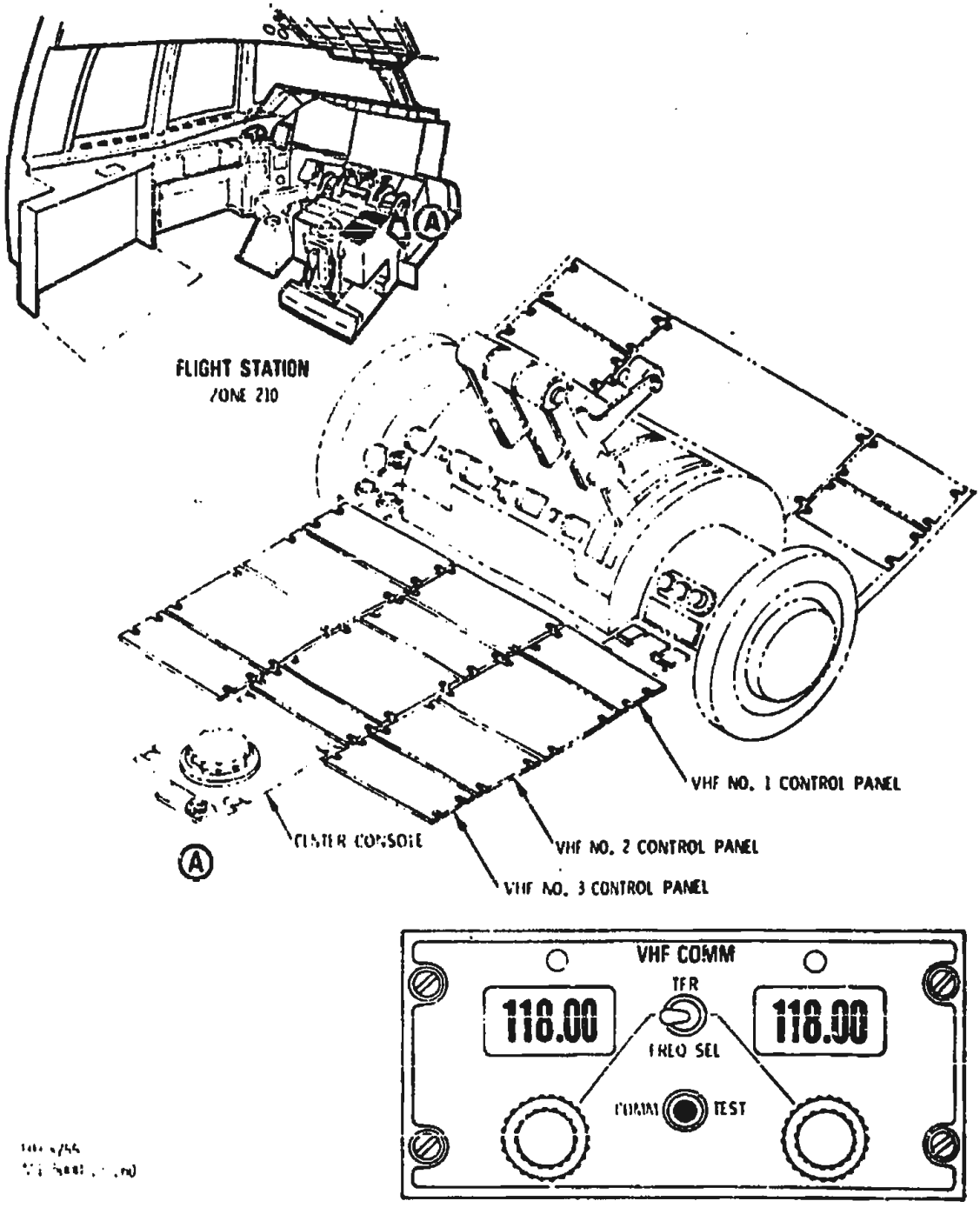
R   (1) Verify that applicable circuit breakers opened in Step 2A(1) are open and tagged.

      (2) Connect electrical connector on back of control panel and lower into pilots center console (Ref. Fig. 401).

      (3) Secure panel with mounting fasteners.

R   (4) Remove tags and close applicable circuit breakers opened in Step 2A(1).

R   (5) Perform operational test of VHF system for which control panel was replaced.



R VHF Control Panels - Removal and Installation
R Figure 401

CR

ACARS - DESCRIPTION AND OPERATION

CR 1. General

CR A. ACARS is a digital data link system that enhances two-way CR communications between the airplane and a ground station.

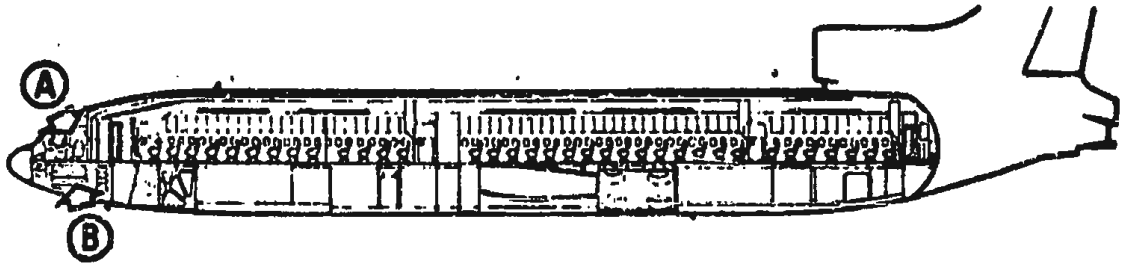
CR B. ACARS (ARINC Communications Addressing and Reporting System) CR enhances air/ground communications by easing the flight CR compartment work load, and eliminating much of the CR air/ground voice communications traffic. ACARS enables a CR high-speed computer controlled digital data link between the CR airplane and ground facilities using: a VHF transceiver, CR ARINC data link stations, landlines, a central ARINC control CR station, and airline terminals. The data link exchanges CR routine airline operations information.

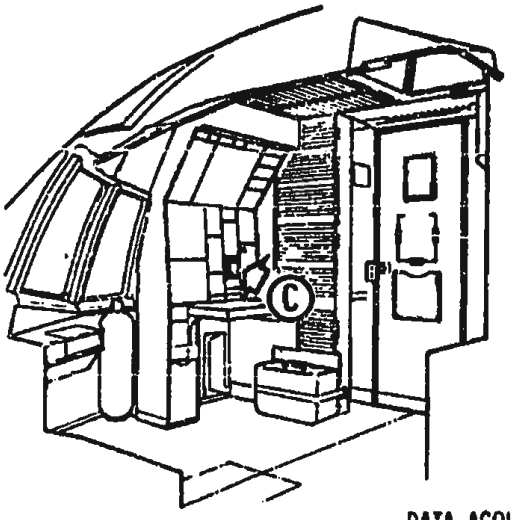
CR C. Acars receives data inputs from airplane sensors, program CR wiring, external systems, and the pilot. Incoming data CR communications are displayed to the pilot via a control CR unit. Outgoing data communications are sent automatically CR or manually. Data is sent using ARINC assigned frequencies CR (primarily 131.550 MHz), in ARINC encoded audio frequency CR tone modulation. ARINC data link stations provide nearly CR continuous air/ground data communications coverage over the CR continental U. S.

CR D. Voice communications via ACARS are initiated from the CR airplane or the ground. ACARS informs the pilot whether the CR ground circuit is ready or busy. When the circuit is ready, CR the pilot uses an assigned frequency and follows normal CR air/ground data communications techniques.

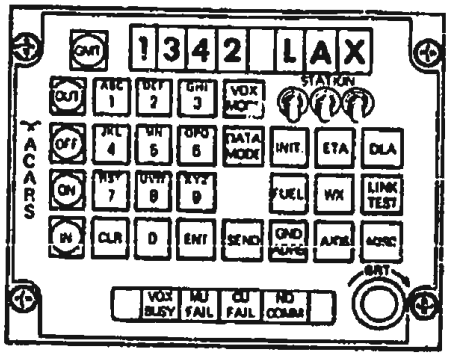
CR E. Power for operation of the ACARS system is supplied from CR normal activation of the AIDS system (Ref. 31-32-00). AC CR power (115 volt) is supplied from AC Essential Buses and DC CR power from the DC Essential Bus. The AIDS System circuit CR breakers are on the Flight Engineer's aft circuit breaker CR panel (CB 3). In addition, 28 volt-dc power is supplied CR from the Hot Battery Bus to the AIDS/ACARS Central CR Electronics Unit (CEU) to maintain ACARS Clock and ACARS CR System memory during AC power shutdown. This circuit CR breaker is located on center overhead Circuit Breaker Panel CR (CB 1).

CR F. The major ACARS components are the AIDS/ACARS CEU (Central CR Electronics Unit) and Control Unit (CU) (Ref. Figure 1).

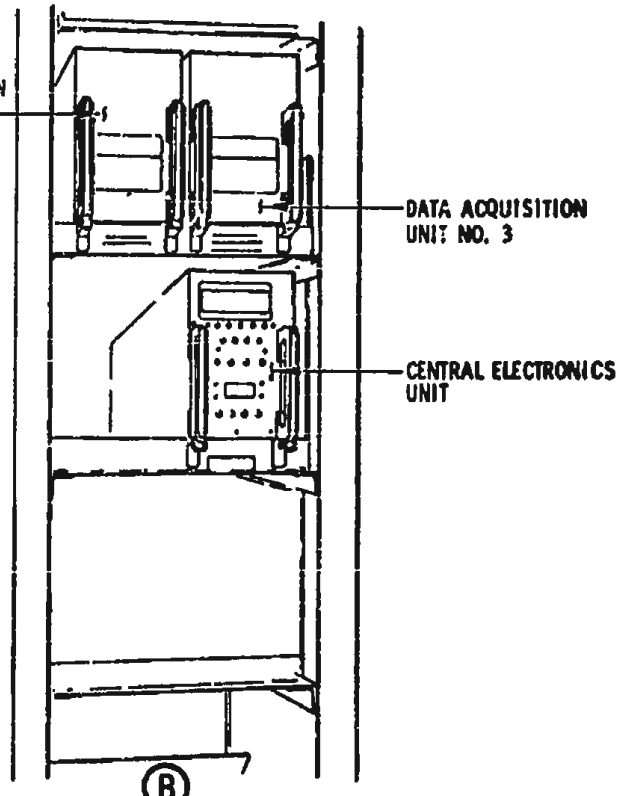




A
FE/SO STATION



C
AIDS CONTROL UNIT



B
FESC LH RACK

MI-0000-23-4239

CR ACARS System Equipment and Location
CR Figure 1

R EFFECTIVITY: ALL
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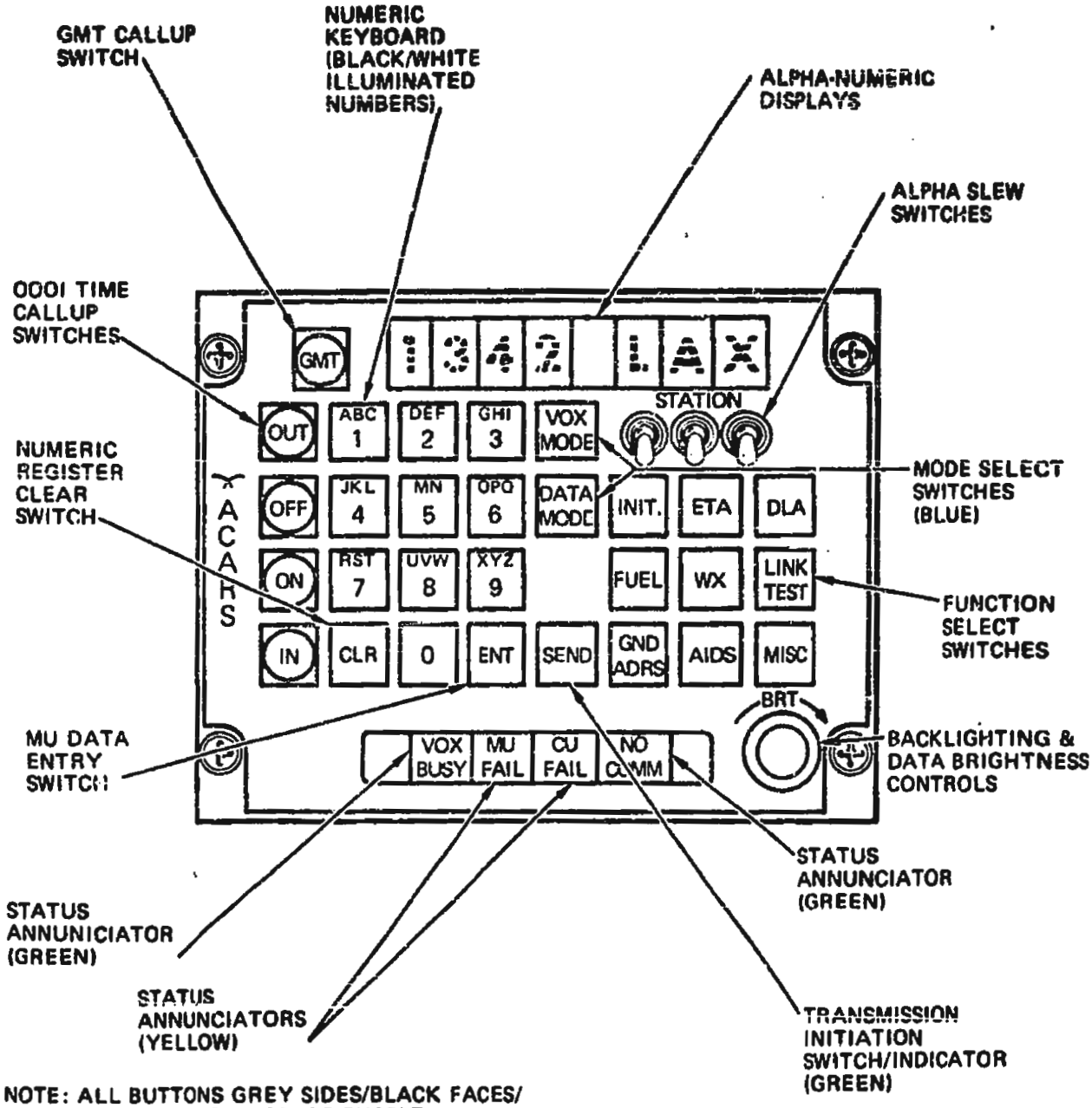

NOTE: ALL BUTTONS GREY SIDES/BLACK FACES/ WHITE ILLUMINATED LEGENDS EXCEPT AS NOTED

CONTROL UNIT - CU

M1-0000-23-4240

CR
CR

ACARS Component Details
Figure 2 (Sheet 1)

R
R
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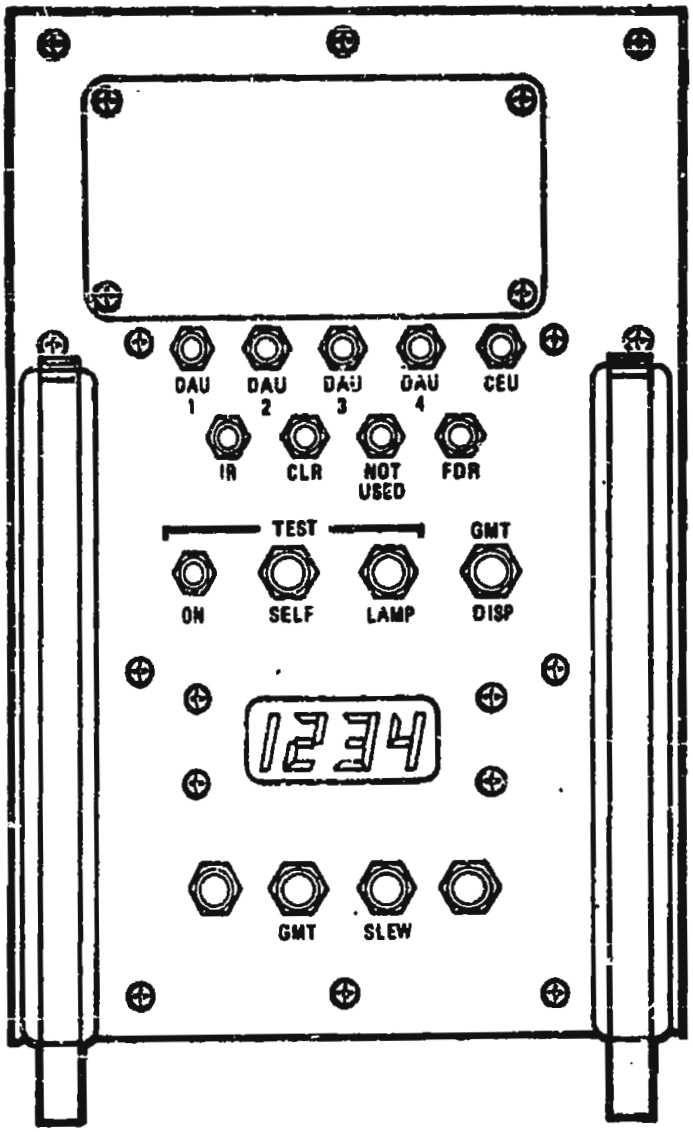
EFFECTIVITY: ALL



AIDS/ACARS CEU

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CR
CR

ACARS Component Details
Figure 2 (Sheet 2)

R EFFECTIVITY: ALL
R
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CR 2. Component Details (Ref. Fig. 2)

CR A. Control Unit (CU)

CR (1) The ACARS control unit is the crews' interface with the
CR ACARS system. The CU panel contains controls for
CR entering, calling up, and transmitting data. The panel
CR also allows operation mode selection, indicator light
CR control, and status and alert annunciation.

CR (2) CU controls and indicators:

CR (a) The two BRT knobs (inner and outer) vary
CR brightness of the CU indicators and display.

CR (b) The three STATION toggle switches vary alpha
CR characters in the corresponding CU display/data
CR register positions.

CR (c) The numeric data keys (0-9) enter numbers into the
CR CU display/data register.

CR (d) The MU data entry switch (ENT) transfers data from
CR the CU display/data register to MU memory.

CR (e) The numeric register clear switch (CLR) clears the
CR CU display and data register.

CR (f) When ACARS is in the data mode, the transmission
CR initiation switch (SEND) causes the MU to downlink
CR (transmit air-to-ground) any message previously
CR entered but not acknowledged by the ground. In
CR either automatic or manual transmission, SEND
CR lights for at least two seconds. SEND remains on
CR until an acknowledgement is received, or until the
CR NO COMM light comes on. When ACARS is in VOX
CR (voice) mode, activation of SEND does not result
CR in a transmission. The DATA MODE switch flashes
CR to alert the pilot that no transmission occurred.

CR (g) The operation mode select switches (DATA MODE and
CR VOX MODE) put ACARS in either the data demand or
CR voice mode.

CR (h) The GMT (Greenwich Mean Time) call-up switch
CR displays the current GMT in hours, minutes, and
CR seconds.

CR (i) The OOOI time call-up switches, (OUT, OFF, ON,
CR IN), display the GMT of the last previous event.

CR (j) The function select switches are: (1) INIT allows systems initialization by requesting entry of Flight No., departure station, destination station, fuel, and ETE (estimated time enroute) data; (2) ETA for entering new ETA time; (3) DLA for entering delay times - used for selection of ONO (out but not off), AWG (awaiting gate), EFC (except further clearance), and EAC (expect approach clearance); (4) FUEL for entering takeoff and post-flight fuel quantities; (5) WX for requesting weather data (not used); (6) LINK TEST for ACARS self test; (7) GND ADRS for entry of airline address codes; (8) AIDS for entry of requests for AIDS data (not used); and (9) MISC for entering other airline functions (used with codes).

CR (3) CU displays:

CR (a) The CU panel has eight 16-segment alpha-numeric displays which show: (1) data entered by the pilot into the CU data register (this is in preparation for MU entry), (2) called up MU data, and (3) incoming message data.

CR (4) CU status and alert indicators:

CR (a) The CU panel has four status and alert indicators: (1) VOX BUSY, (2) MU FAIL, (3) CU FAIL, and (4) NO COMM.

CR (b) VOX BUSY lights up when pilot-initiated ground address calls for voice communications cannot be executed. This is due to ground facilities being busy.

CR (c) MU FAIL lights up when an MU failure is detected by BITE (built-in-test equipment).

CR (d) CU FAIL lights up when a CU failure is detected by BITE.

CR (e) NO COMM lights up when downlink data messages are transmitted up to six times, and do not receive acknowledgement from the ground. NO COMM is not necessarily an airplane hardware failure, but is a failure of the system to establish contact with a ground station. This could be due to failure of the MU-transceiver interface, the transceiver, the ground station, or not being within range of a ground station.

CR (5) The ACARS CU is located on the flight engineer's panel
CR (Ref. Fig. 1).

CR B. AIDS/ACARS CEU

CR (1) The existing AIDS CEU has been modified to provide for
CR the central clock, memory, and ACARS central processing
CR and management functions. The ACARS portion of this
CR unit interfaces with on board event sensors, program
CR wiring, the ACARS Control Unit, and the No. 3 VHF
CR Transceiver. Data is received, processed, error
CR checked, and stored by ACARS circuits from these
CR sources. Data is produced and sent (by ACARS circuits)
CR to the ground via the VHF Transceiver.

CR (2) The AIDS/ACARS CEU is located on the center shelf of
CR the L. H. AIDS rack in the FESC (Ref. Figure 1).

CR 3. Operation (Ref. Fig. 2)

CR A. Functional Description

CR (1) Off mode:

CR (a) ACARS is off when 115-volt ac power is removed
CR from the MU. There is no system activity or
CR indications.

CR (b) The GMT clock runs as long as power is provided
CR from the 28-volt dc hot battery bus. Certain
CR data, such as 000I items from previous operations
CR are retained in non-volatile memory.

CR (2) Data Mode:

CR (a) In the data mode, ACARS downlinks data: (1) in
CR response to uplink messages requiring replies; (2)
CR when the pilot initiates transmission; or (3)
CR automatically with certain events (000I events).
CR The downlink occurs when the MU senses the channel
CR is free of other traffic.

CR (b) The data mode is entered from the off mode when ac
CR power is applied to the MU or the VOX mode upon
CR crew command (DATA MODE switch), or ground
CR command.

CR (c) The data mode exits to the OFF mode when ac power
CR is removed from the MU, or the VOX mode when
CR commanded by the crew or ground.

CR (3) VOX mode:

CR (a) The VOX mode provides the ARINC voice link for
CR contact with ground addresses. In VOX mode, the
CR MU continues to compile, but does not transmit
CR data. The VHF transceiver is used for voice
CR communication. The MU notifies the crew if VOX
CR mode persists more than two minutes.

CR (b) ACARS operation and VHF radio frequency control is
CR selected at the CU lighted keys VOX MODE and DATA
CR MODE. DATA MODE selection allows the AIDS/ACARS
CR CEU to automatically tune No. 3 VHF COMM
CR transceiver to the ARINC frequency of 131.550 MHz.
CR With VOX MODE selected, the No. 3 VHF COMM
CR transceiver is tuned with the No. 3 VHF control
CR panel, and voice transmissions may be made using a
CR microphone/headset selected to No. 3 VHF system.
CR If a crew member should need to use the No. 3 VHF
CR system for a voice transmission, selection of VOX
CR at the ACARS CU at the Flight Engineer's panel
CR will allow frequncy selection and voice operation
CR on the No. 3 VHF system.

CR (4) AIDS/ACARS CEU Power

CR (a) The AIDS/ACARS CEU receives 115 volts AC and 28
CR volts DC. Normally, the 115 volts develops all
CR power used by ACARS. When the 115 volt power is
CR not present, the 28 volt dc source supplies power
CR for the clock and the non-volatile memory.

CR (5) AIDS/ACARS CEU Microprocessor

CR (a) The AIDS/ACARS CEU Microprocessor provides central
CR operational control and computations. It is a
CR 16-bit microprocessor with: (1) EPROM'S for
CR software programming; (2) RAM (ramdom access
CR memory) for data storage; and (3) non-volatile
CR memory for data such as OOOI times and
CR departure/destination information. The
CR microprocessor provides power-up initialization,
CR BITE, and normal processing and operational
CR routines (arithmetic logic, control logic, I/O).
CR External interrupts are available.

CR (6) Clock generator:

CR (a) The AIDS/ACARS CEU clock generator provides timing
CR for the entire system. The clock generator has a
CR 3 MHz oscillator with dividers to provide 60 kHz

CR to the CU, and 600 kHz and 300 kHz to the
CR modulator.

CR (7) AIDS/ACARS CEU-CU Interface

CR (a) The AIDS/ACARS CEU microprocessor sends data to
CR the CU via a parallel-to-serial converter. Data
CR is clocked to the CU at 30 kHz.

CR (b) The AIDS/ACARS CEU clock provides a 60 kHz signal
CR to the CU. The signal provides the CU with latch
CR controls and output data clocking.

CR (c) Incoming CU data to the AIDS/ACARS CEU is supplied
CR to a multiplexer, then sent to the microprocessor.

CR (8) Airline and airplane identification pins:

CR (a) Program pins are wired to provide airline
CR identification and airplane registration numbers.

CR (b) The airplane registration number has seven
CR characters, and the airline identification has
CR two.

CR (9) Out, Off, On, In (OOOI) sensors:

CR (a) The OOOI event program pins encode the OOOI sensor
CR inputs for the AIDS/ACARS CEU. The sensor inputs
CR are presented to the AIDS/ACARS CEU microprocessor
CR where the definitions for OOOI events are included
CR in software. The microprocessor determines when
CR an event has occurred, and stores the event GMT
CR and departure/arrival station in memory, for
CR reporting and display.

CR (b) An Out event is registered when main entry door is
CR closed, and the parking brake is released for more
CR than 2 seconds (new departure and destination
CR stations must already be entered). An Off event
CR is registered when door is closed, the brake
CR released, and the air/ground relay (landing gear
CR switch) indicates the plane airborne for more than
CR 10 seconds. An On event is registered when the
CR air/ground relay indicates the plane is on the
CR ground for more than 10 seconds. An In event is
CR registered when the main entry door is open, or
CR the parking brake is set for more than two
CR seconds.

CR (c) When any OOOI event occurs, the event time and
CR station are automatically downlinked.

CR (10) Pilot's SELCAL Control Panel

CR (a) A voice go-ahead signal from the AIDS/ACARS CEU
CR microprocessor causes the SELCAL-2 light on the
CR SELCAL control panel to illuminate.

CR (b) Voice go-ahead signal also sounds cockpit aural
CR warning chime.

CR (c) Reset is accomplished by momentary activation at
CR VHF-2 SELCAL light.

CR (11) AIDS/ACARS CEU-VHF transceiver interface:

CR (a) The source of VHF-3 transceiver tuning is selected
CR by VOICE/DATA relay located on VHF-3 transceiver
CR shelf. Selection of DATA mode at the ACARS CU
CR connects AIDS/ACARS CEU two-out-of-five tuning
CR information to VHF-3 frequency selection inputs.
CR Keying the transceiver in the data mode is done by
CR AIDS/ACARS CEU circuits.

CR (b) Data is supplied to the transceiver from an
CR encoder/modulator, in the form of 1200/2400 Hz
CR tones. The data is applied directly to the
CR transceiver modulator for transmission.

CR (c) Data to the AIDS/ACARS CEU from the transceiver is
CR in the same form as outgoing data. The data is
CR demodulated and sent to the AIDS/ACARS CEU.

CR (d) If VH-3 audio is monitored while in the DATA mode,
CR bursts of digital data (1200/2400 Hz tones) will
CR be heard as a result of air-to-ground and
CR ground-to-air messages from TWA or other airline
CR aircraft.

CR (12) CU Power:

CR (a) The CU receives 16 volt-dc power from the
CR AIDS/ACARS CEU. The 16 volt-dc is converted to 12
CR volts dc for electronics use, and 6-volt dc for a
CR reference voltage used by timing circuits. The
CR 12-volts dc is used by AIDS/ACARS CEU regulators
CR and the CU brightness controls to control the
CR indicator and backlighting brightness.

CR (13) CU-AIDS/ACARS CEU data: General

CR (a) The data transferred between the CU and AIDS/ACARS
CR CEU is serial digital BCD (binary coded decimal).

CR (14) Incoming CU data:

CR (a) Incoming data to the CU is for lamp and display status. For test, a special data bit is placed in the data stream. Clocking is a separate signal. The MU FAIL and CU FAIL lamps are controlled by, and directly wired to the AIDS/ACARS CEU.

CR (b) Data is brought from the AIDS/ACARS CEU in syncronism with the gated clock signal. Entering data is placed into data latches (by an address decoder) corresponding to the lamp element to be turned ON or OFF. The latch output turns on/off appropriate lamps or display segments.

CR (15) Outgoing CU data:

CR (a) Outgoing data to the AIDS/ACARS CEU is the serial output of a parallel-to-serial (P-TO-S) shift register. The data inputs to the P-TO-S register are the alpha-numeric characters on the CU display, and a special test bit state. Data is clocked out of the register by the gated clock signal. The register is reset and loaded by signals from a timer/address counter.

CR B. Control Unit

CR (1) BRT controls:

CR (a) Rotate the inner BRT knob to vary brightness of pushbutton backlighting.

CR (b) Rotate the outer BRT knob to vary brightness of activated displays, status indicators, and pushbuttons (except CLR, ENT, GMT, and 0-9).

CR (2) GMT selection:

CR (a) Press the GMT switch to display the current GMT in hours, minutes, and seconds. Press GMT again to clear the display. GMT is reset automatically by an ARINC uplink message by use of a MISC code provided the airplane is still in gate.

CR (3) OUT selection:

CR (a) Press and hold the OUT switch to display the GMT of the last OUT event. The white OUT light comes on. Release OUT to clear the display. OUT will dim.

CR (4) OFF selection:

CR (a) Press and hold the OFF switch to display the GMT
CR of the last Off event. The white OFF light comes
CR on. Release OFF to clear the display. OFF will
CR dim.

CR (5) ON selection:

CR (a) Press and hold the ON switch to display the GMT of
CR the last On event. The white ON light comes on.
CR Release ON to clear the display. ON will dim.

CR (6) IN selection:

CR (a) Press and hold the IN switch to display the GMT
CR and destination station of the last IN event. The
CR white IN light comes on. Release IN to clear the
CR display. IN will dim.

CR (7) DATA MODE selection:

CR (a) Press the DATA MODE switch to place ACARS in the
CR appropriate data mode. The blue DATA MODE light
CR comes ON, and VOX MODE goes OFF.

CR (8) VOX MODE selection:

CR (a) Press the VOX MODE switch to place ACARS in voice
CR mode. The blue VOX MODE light comes ON, and DATA
CR MODE goes OFF.

CR (b) When an uplink request for VOX mode is made, VOX
CR MODE flashes, SELCAL-2 light flashes, and cockpit
CR aural warning chime sounds. Reset SELCAL-2 light
CR and press VOX MODE; display will show V _ _ 1 2 9
CR .4 5 if ground includes frequency in test;
CR otherwise display will show V _ _ _ _ _ and
CR applicable ARINC network frequency should be
CR selected at VHF-3 COMM control panel and normal
CR voice communications initiated.

CR (9) WX selection

CR (a) Press the WX switch to display W X _ _ _ X X X
CR (where XXX is stored destination station). Use
CR STA slew switches to select different station, if
CR desired. Press ENT. Press SEND to transmit
CR weather request message.

CR (b) When response message is received, MISC switch
CR light flashes. MISC light comes on steady and CU
CR display indicates 45.

CR (c) Press ENT and weather message is displayed on the
CR CU 8 character display in a moving Times Square
CR fashion from right to left. Allow complete
CR message to be displayed at least once.

CR NOTE: If a WX message is not allowed to be viewed
CR completely and the WX switch is pushed
CR again to request another station's weather,
CR ACARS system rejects all future messages
CR addressed to the CU display.

CR (d) Press MISC or CLR to clear display.

CR (10) AIDS selection

CR (a) Press AIDS switch and display reads A I D S _ _ 0
CR 0. When requested by the ground, pressing 5, and
CR 2, and ENT sends an engine performance message in
CR a pre-programmed format.

CR (11) MISC selection:

CR (a) Press the MISC switch to have ACARS perform
CR miscellaneous functions. The white MISC light
CR comes on. Enter a two-digit MISC code (the codes
CR are listed in the pilot's manual), and press ENT.
CR MISC dims, and the response for the MISC code is
CR initiated.

CR (12) Link Test:

CR (a) At ACARS CU, select DATA MIDE (in VOX MODE, LINK
CR TEST causes the DATA MODE switch to flash). Press
CR LINK TEST pushbutton. LINK TEST pushbutton light
CR should illuminate. The following lights and
CR indicators come on sequentially for a maximum of
CR five seconds.

CR 1) The left four display digits (all segments).

CR 2) The right four display digits (all
CR segments).

CR 3) All function selectors (pushbuttons) and
CR status indicators.

CR NOTE: If MU or CU fail bite tests, the
CR appropriate MU FAIL of CU FAIL annunciator
CR remains lit.

CR (b) After lamp tests, the SELCAL-2 light on the SELCAL
CR control panel will illuminate and the cockpit
CR aural warning chime will sound. Reset by
CR momentarily pushing SELCAL-2 light.

CR (c) After SELCAL indicator test, a loop-back message
CR is transmitted to the ARINC ground station. The
CR SEND pushbutton light comes on until the ground
CR station sends acknowledge message. SEND light
CR goes out and LINK TEST goes out. If no
CR acknowledgement is received, the green NO COMM
CR light comes on.

CR C. BITE

CR (1) The BITE hardware is designed to determine if a failure
CR exists in the AIDS/ACARS CEU or CU, and indicate the
CR failure on both units. If either unit fails,
CR transceiver control is given to the transceiver control
CR panel.

CR (2) BITE decisions are made in the AIDS/ACARS CEU, and the
CR fail indicators are driven by the AIDS/ACARS CEU.

CR (3) BITE harware tests: (1) modulator output wraparound to
CR demodulator input-monitors AIDS/ACARS CEU transmissions
CR (the modulator output is sent to the demodulator input,
CR and the two signals are compared in the AIDS/ACARS
CR CEU); (2) monitors line driver outputs to CU; (3)
CR monitors input circuits from the CU to line receivers;
CR and (4) CU and MU fault indicator drivers.

CR NOTE: ACARS Control Unit Fault Indicators show CU or
CR MU.

CR (4) Software causes failure indication if there is an error
CR on the following software checks: (1) AIDS/ACARS CEU
CR timer is reset every 100msec; (2) transceiver
CR modulator/demodulator wraparound; (3) MU/CU wraparound;
CR (4) GMT read errors; (5) GMT sense low; (6) extra
CR modulator interrupt; and (7) missing CU interrupt. If
CR the 16 volt dc power supply fails in the AIDS/ACARS
CR CEU, software causes CU FAIL to light up.

CR (5) The CU FAIL light goes off when the AIDS/ACARS CEU is
CR in the fail mode.

CR (6) LINK TEST:

CR (a) LINK TEST performs an internal self-test of ACARS
CR circuit functions. Lamp and display are performed
CR in three sequential steps, then a test downlink
CR message is sent. The test only operates in DATA
CR MODE (in VOX MODE, LINK TEST causes the DATA MODE
CR switch to flash).

CR (b) To initiate LINK TEST, press the LINK TEST switch.
CR The white LINK TEST light comes on. The following
CR lights and indicators come on sequentially, for a
CR maximum of five seconds: (1) the left four display
CR digits (all segments), (2) the right four display
CR digits (all segments), and (3) all pushbuttons and
CR status indicators. Next, a test downlink message
CR is sent, and SEND lights up for at least two
CR seconds. If an acknowledgement is received: (1)
CR the SELCAL No. 2 light (on the SELCAL Control
CR panel) comes on, (2) a chime sounds, (3) SEND goes
CR off, and (4) LINK TEST dims. If no
CR acknowledgement is received, the amber NO COMM
CR light comes on. If the CU or AIDS/ACARS CEU fails
CR its BITE test, the proper fail lamp stays on after
CR the LINK TEST.

CR

ACARS SYSTEM - FAULT ISOLATION

CR 1. General

CR The diagrams and schematics in this section can be used for
CR fault isolation any time a fault is reported or suspected. The
CR PREREQUISITES listed at the top of each fault isolation diagram
CR must be satisfied prior to starting fault isolation. Uncommon
CR abbreviations are defined on the using fault code or schematic.

CR If the flight crew reports a trouble using a fault code number,
CR the code number can be found in the Fault Isolation Reference
CR Table in the Chapter 23 Fault Code Index. The index specifies
CR the exact maintenance manual section, fault isolation diagram,
CR and block number on the diagram where the fault isolation
CR procedure should start. Schematics are included at the end of
CR the section to supplement the fault code diagrams or as an aid
CR in isolating a problem not covered on the diagrams.

CR Refer to the Maintenance Manual Introduction for a more detailed
CR discussion of the Fault Isolation Reporting Method (FIRM) and
CR use of fault isolation diagrams/schematics.

CR 2. Fault Isolation/Identification

CR Table 101 lists the fault isolation diagrams and schematics in
CR this section.

CR Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	ACARS Control Unit BITE Procedure
SCHEM 1	ACARS System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ACARS VOICE/DATA RELAY	1	FESC; REAR RACK 112AB	23-23-03
CEU-AIDS/ACARS	1	FESC; AIDS RACK CTR SHELF	23-24-01
CIRCUIT BREAKERS:			
AIDS/ACARS BAT CLK	1	PILOTS OVHD CKT BRKR PANEL CB-1	23-24-01
AIDS/FLT RCDR	1	FE/SO AFT CB PANEL CB3	31-32-00
SELCAL	1	PILOTS OVHD CKT BRKR PANEL P8	23-22-01
VHF NO. 3	1	PILOTS OVHD CKT BRKR PANEL (CB1)	23-23-03
DECODER-SELCAL	1	FESC; LH REAR RACK, SHELF 4	23-22-01
PANEL-ACARS CONTROL	1	FLT STA: FLIGHT ENGINEERS'S LOWER PANEL	23-24-01
PANEL-CONTROL, VHF COMM-3	1	FLT STA: P17	23-23-03
PANEL-CONTROL, SELCAL	1	FLT STA: P17	23-22-01
SPKR-ELECTRONIC CHIME	1	FLT STA: PILOTS OVHD PANEL	23-22-01
TRANSCEIVER-VHF COMM-3	1	FESC: LH REAR RACK, SHELF 2	23-23-03
IND LT CONTROL BOX	1	FESC: RH FWD 113-240	32-48-01 52-71-02

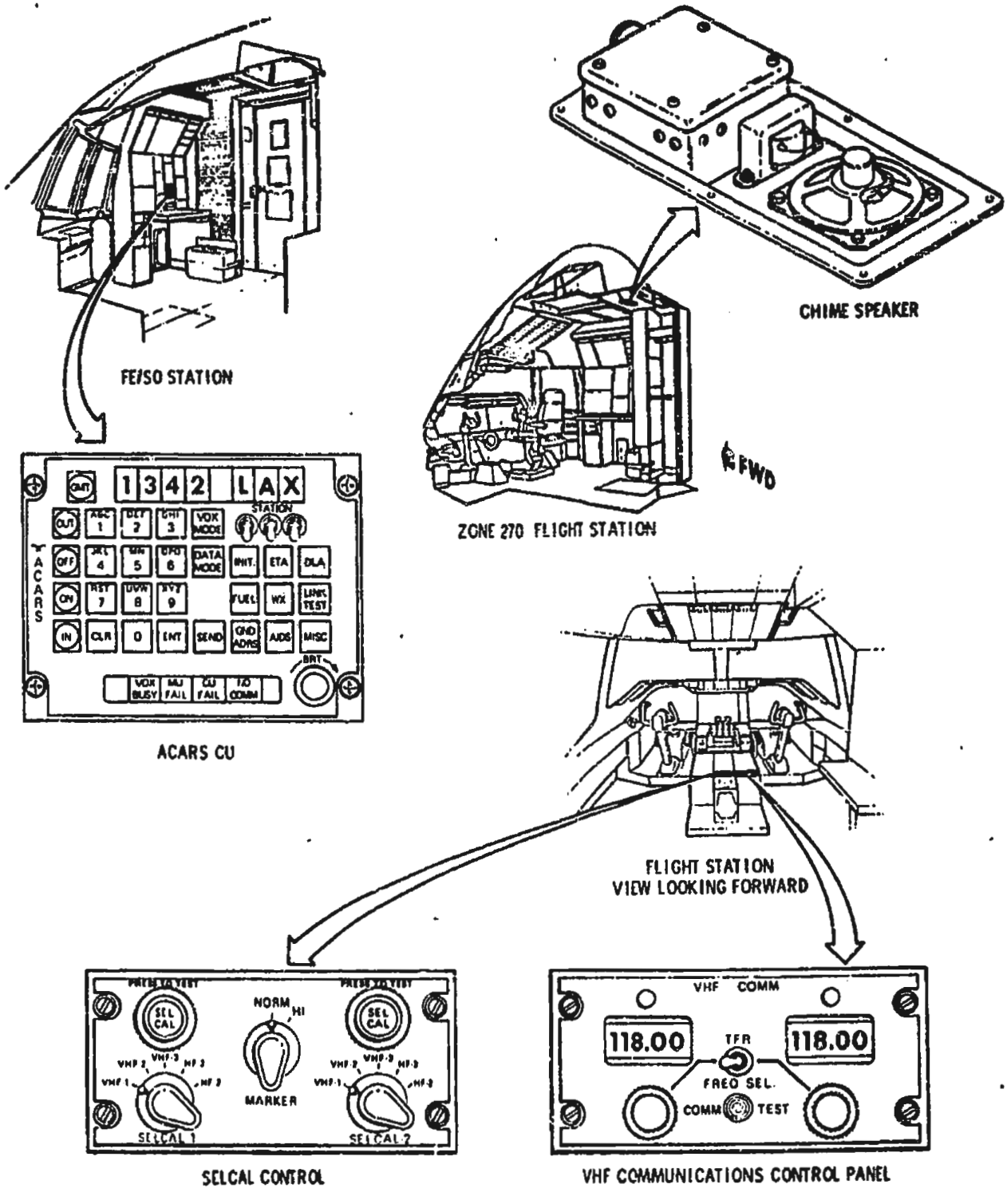
*SEE WM EQUIPMENT LIST

M1-0000-23-4242

CR
CR

Component Location Index
Figure 101

R EFFECTIVITY: ALL
R
001B



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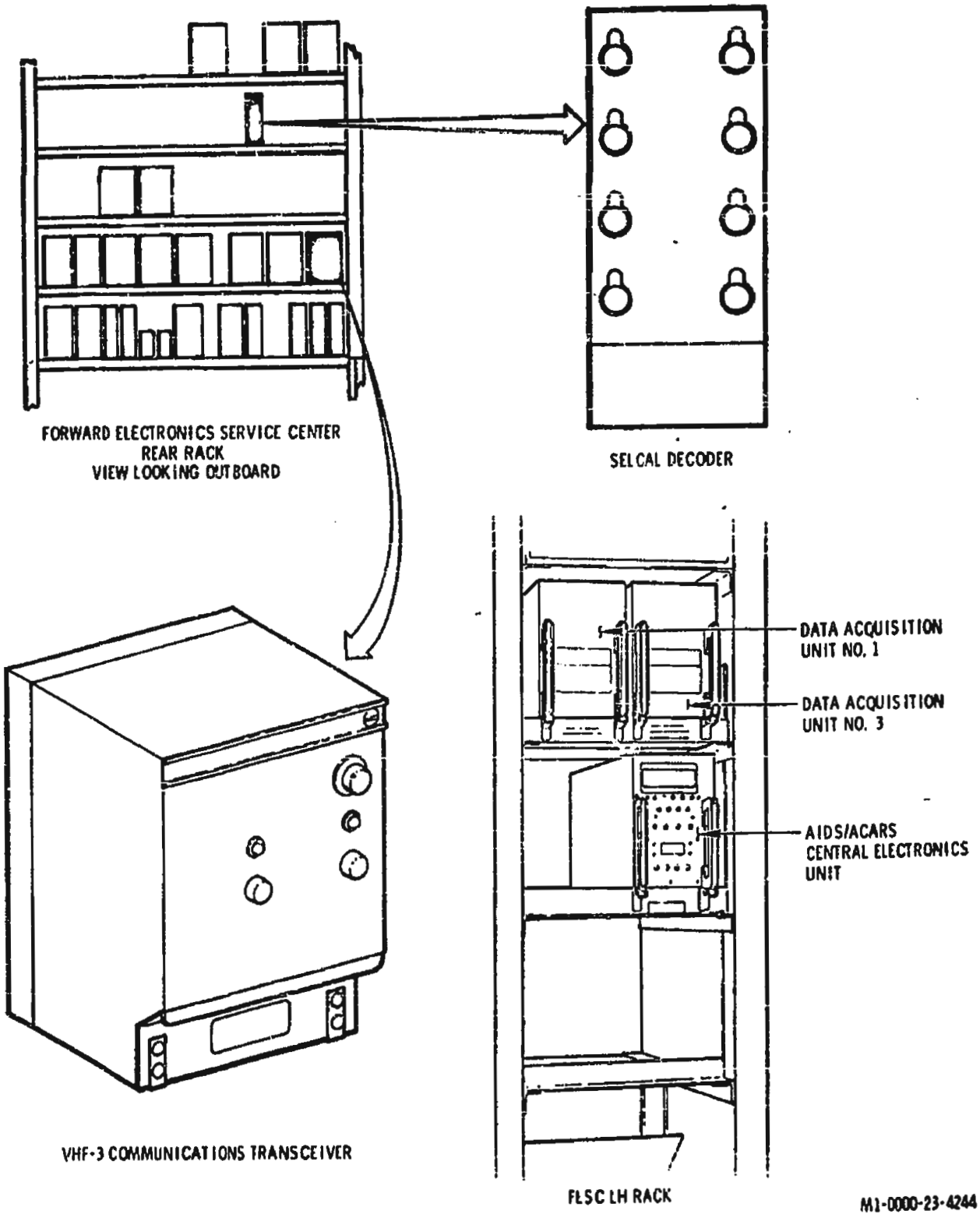
CR
CR

Component Locator Diagram
Figure 102 (Sheet 1)

R
R
001B

EFFECTIVITY: ALL



CR
CR

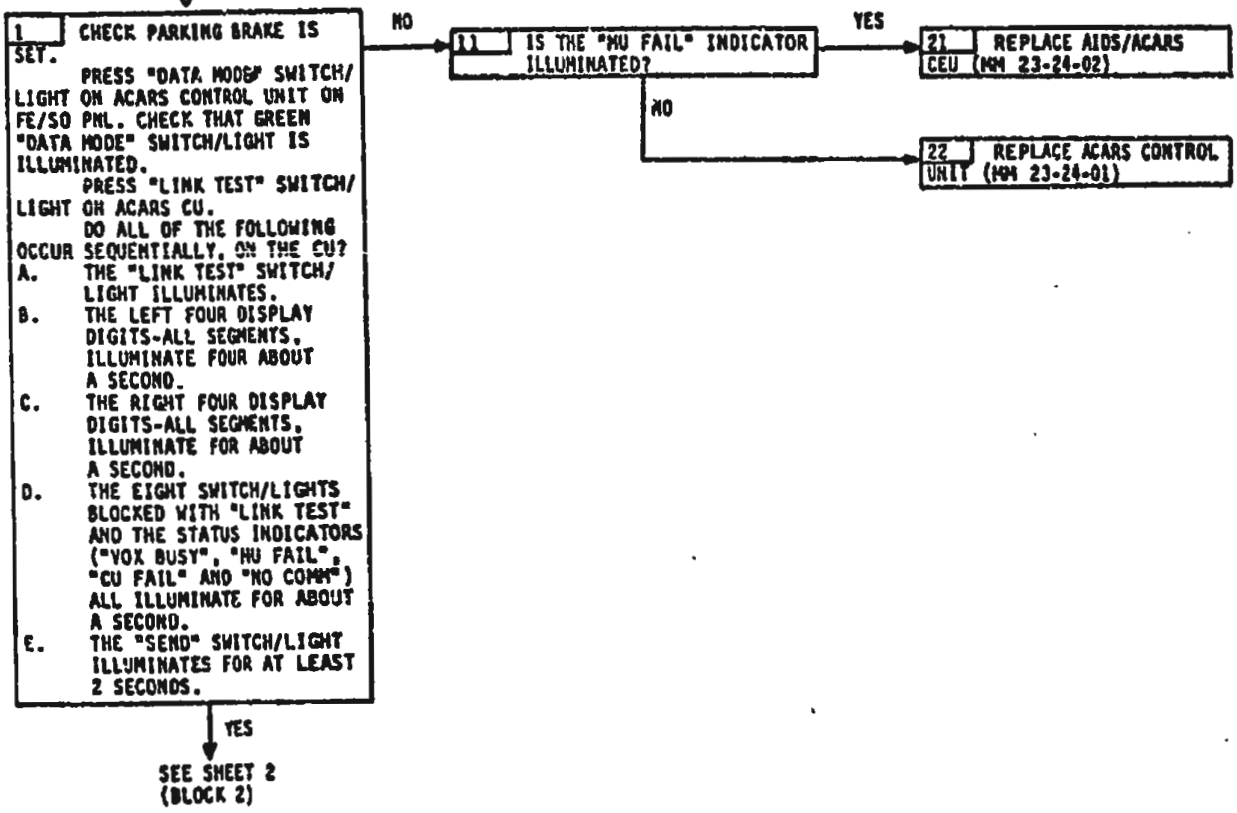
Component Locator Diagram
Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

PREREQUISITES

ELECTRICAL POWER (MM 24-22-00)
No.3 VHF COMMUNICATIONS SYSTEM (MM 23-23-00)
CHIME SPEAKER (MM 23-41-00)
DOOR WARNING SYSTEM (MM 52-71-00)
PARKING BRAKE SYSTEM (MM 32-48-00)
ACTIVE ARINC GROUND STATION TIED TO ACARS
SELCAL SYSTEM (MM 23-22-00)
CB'S IN: B16 (CB1 OVHD C.B. PNL)
H11 (CB3 F E AFT C.B. PNL)
C23 (CB1 OVHD C.B. PNL)

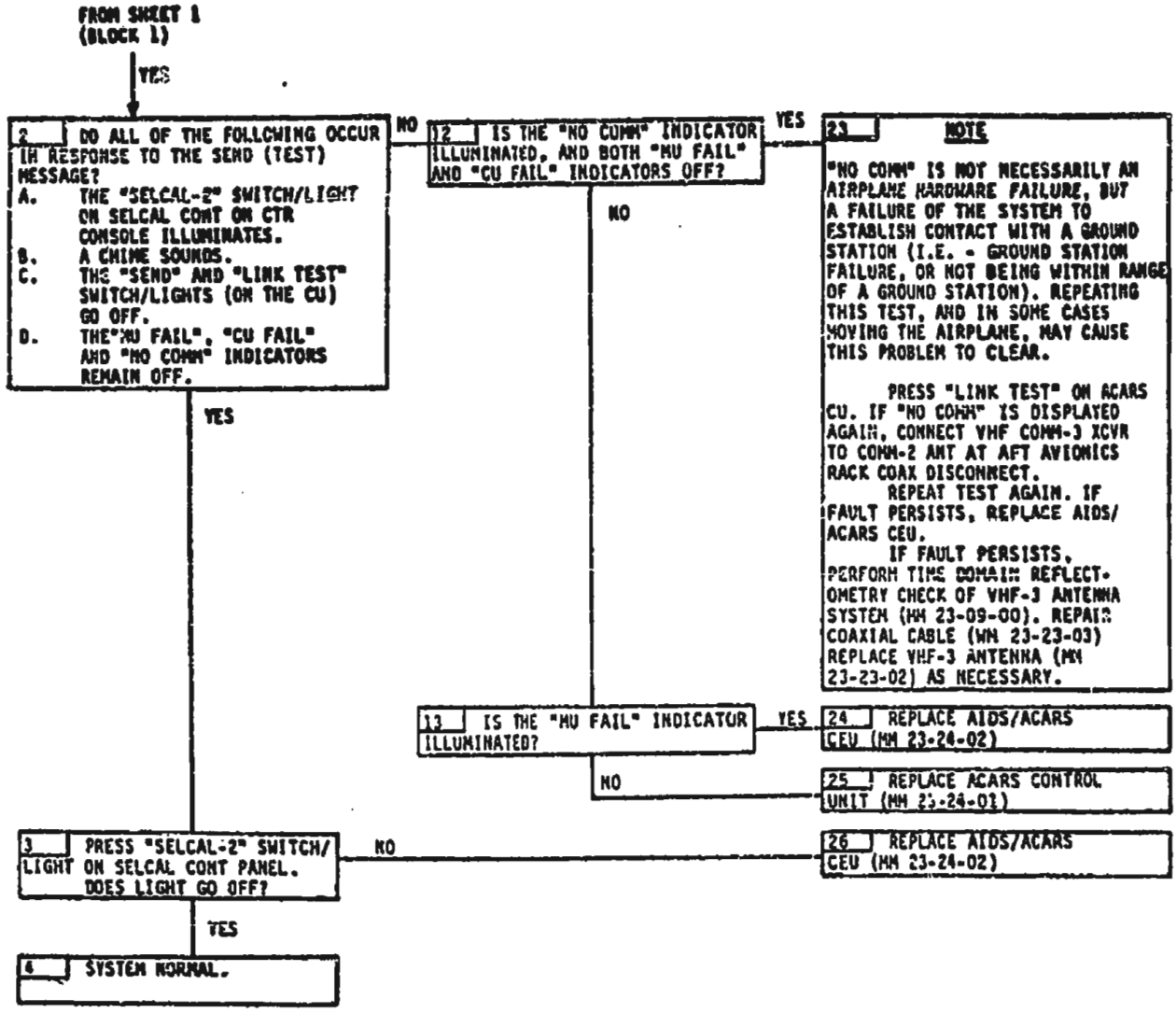
ACARS CONTROL UNIT BITE PROCEDURE


1 CHECK PARKING BRAKE IS SET.
PRESS "DATA MODE" SWITCH/LIGHT ON ACARS CONTROL UNIT ON FE/SO PNL. CHECK THAT GREEN "DATA MODE" SWITCH/LIGHT IS ILLUMINATED.
PRESS "LINK TEST" SWITCH/LIGHT ON ACARS CU.
DO ALL OF THE FOLLOWING OCCUR SEQUENTIALLY, ON THE CU?
A. THE "LINK TEST" SWITCH/LIGHT ILLUMINATES.
B. THE LEFT FOUR DISPLAY DIGITS-ALL SEGMENTS, ILLUMINATE FOUR ABOUT A SECOND.
C. THE RIGHT FOUR DISPLAY DIGITS-ALL SEGMENTS, ILLUMINATE FOR ABOUT A SECOND.
D. THE EIGHT SWITCH/LIGHTS BLOCKED WITH "LINK TEST" AND THE STATUS INDICATORS ("VOX BUSY", "HU FAIL", "CU FAIL" AND "NO COMM") ALL ILLUMINATE FOR ABOUT A SECOND.
E. THE "SEND" SWITCH/LIGHT ILLUMINATES FOR AT LEAST 2 SECONDS.
NO
YES
11 IS THE "HU FAIL" INDICATOR ILLUMINATED?
YES
21 REPLACE AIDS/ACARS CEU (MM 23-24-02)
NO
22 REPLACE ACARS CONTROL UNIT (MM 23-24-01)
YES
SEE SHEET 2 (BLOCK 2)

M1-0000-23-4245

CR ACARS Control Unit BITE Procedure
CR Figure 103 (Sheet 1)

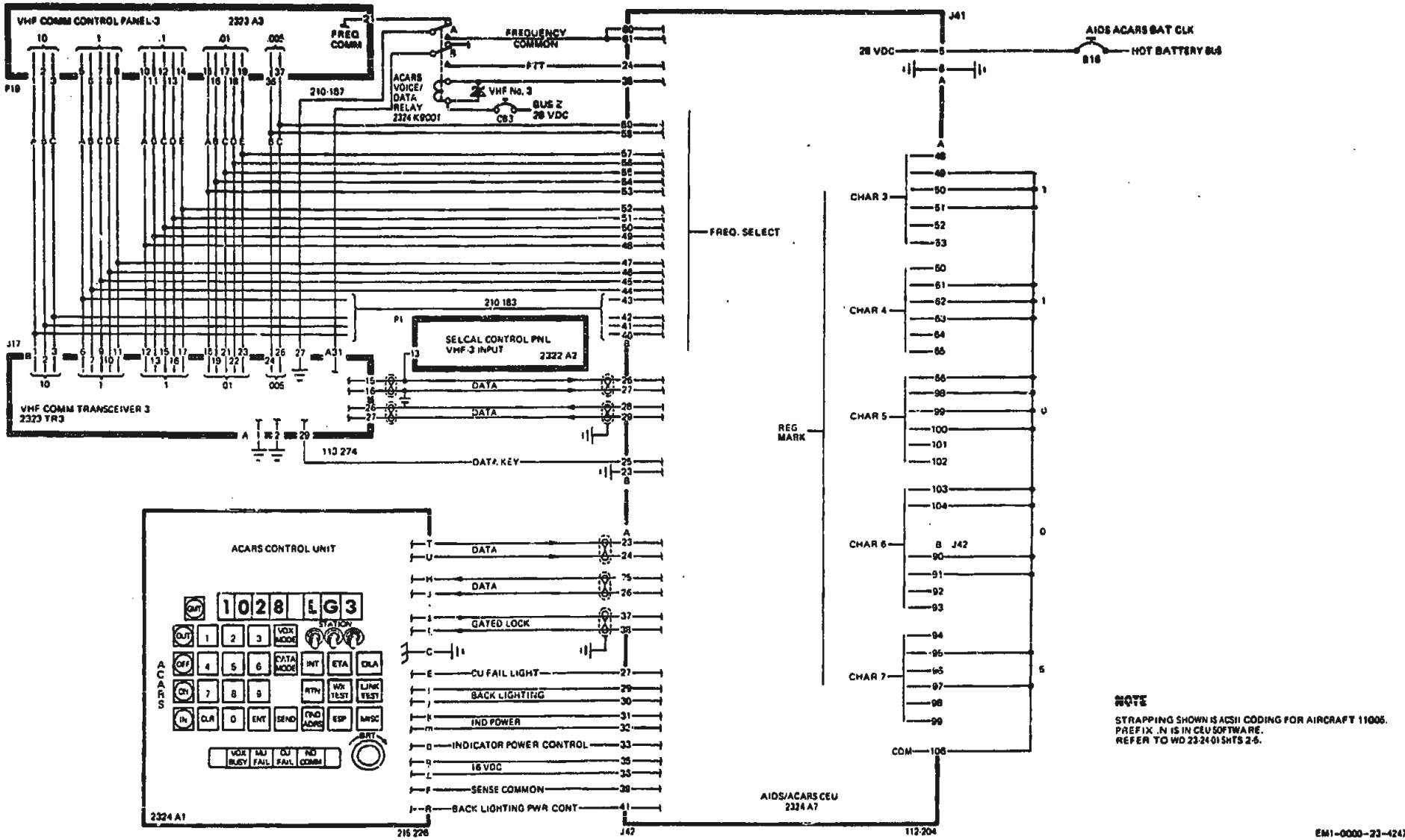
R EFFECTIVITY: ALL
R
001B


FROM SHEET 1 (BLOCK 1)
YES
2 DO ALL OF THE FOLLOWING OCCUR IN RESPONSE TO THE SEND (TEST) MESSAGE?
A. THE "SELCAL-2" SWITCH/LIGHT ON SELCAL CONT ON CTR CONSOLE ILLUMINATES.
B. A CHIME SOUNDS.
C. THE "SEND" AND "LINK TEST" SWITCH/LIGHTS (ON THE CU) GO OFF.
D. THE "MU FAIL", "CU FAIL" AND "NO COMM" INDICATORS REMAIN OFF.
NO
12 IS THE "NO COMM" INDICATOR ILLUMINATED, AND BOTH "MU FAIL" AND "CU FAIL" INDICATORS OFF?
YES
23 NOTE
"NO COMM" IS NOT NECESSARILY AN AIRPLANE HARDWARE FAILURE, BUT A FAILURE OF THE SYSTEM TO ESTABLISH CONTACT WITH A GROUND STATION (I.E. - GROUND STATION FAILURE, OR NOT BEING WITHIN RANGE OF A GROUND STATION). REPEATING THIS TEST, AND IN SOME CASES MOVING THE AIRPLANE, MAY CAUSE THIS PROBLEM TO CLEAR.
PRESS "LINK TEST" ON ACARS CU. IF "NO COMM" IS DISPLAYED AGAIN, CONNECT VHF COMM-3 XCVR TO COMM-2 ANT AT AFT AVIONICS RACK COAX DISCONNECT.
REPEAT TEST AGAIN. IF FAULT PERSISTS, REPLACE AIDS/ACARS CEU.
IF FAULT PERSISTS, PERFORM TIME DOMAIN REFLECTOMETRY CHECK OF VHF-3 ANTENNA SYSTEM (MM 23-09-00). REPAIR COAXIAL CABLE (MM 23-23-03) REPLACE VHF-3 ANTENNA (MM 23-23-02) AS NECESSARY.
NO
13 IS THE "MU FAIL" INDICATOR ILLUMINATED?
YES
24 REPLACE AIDS/ACARS CEU (MM 23-24-02)
NO
25 REPLACE ACARS CONTROL UNIT (MM 23-24-01)
YES
3 PRESS "SELCAL-2" SWITCH/LIGHT ON SELCAL CONT PANEL. DOES LIGHT GO OFF?
NO
26 REPLACE AIDS/ACARS CEU (MM 23-24-02)
YES
4 SYSTEM NORMAL.

M1-0000-23-4246

CR ACARS Control Unit BITE Procedure
CR Figure 103 (Sheet 2)

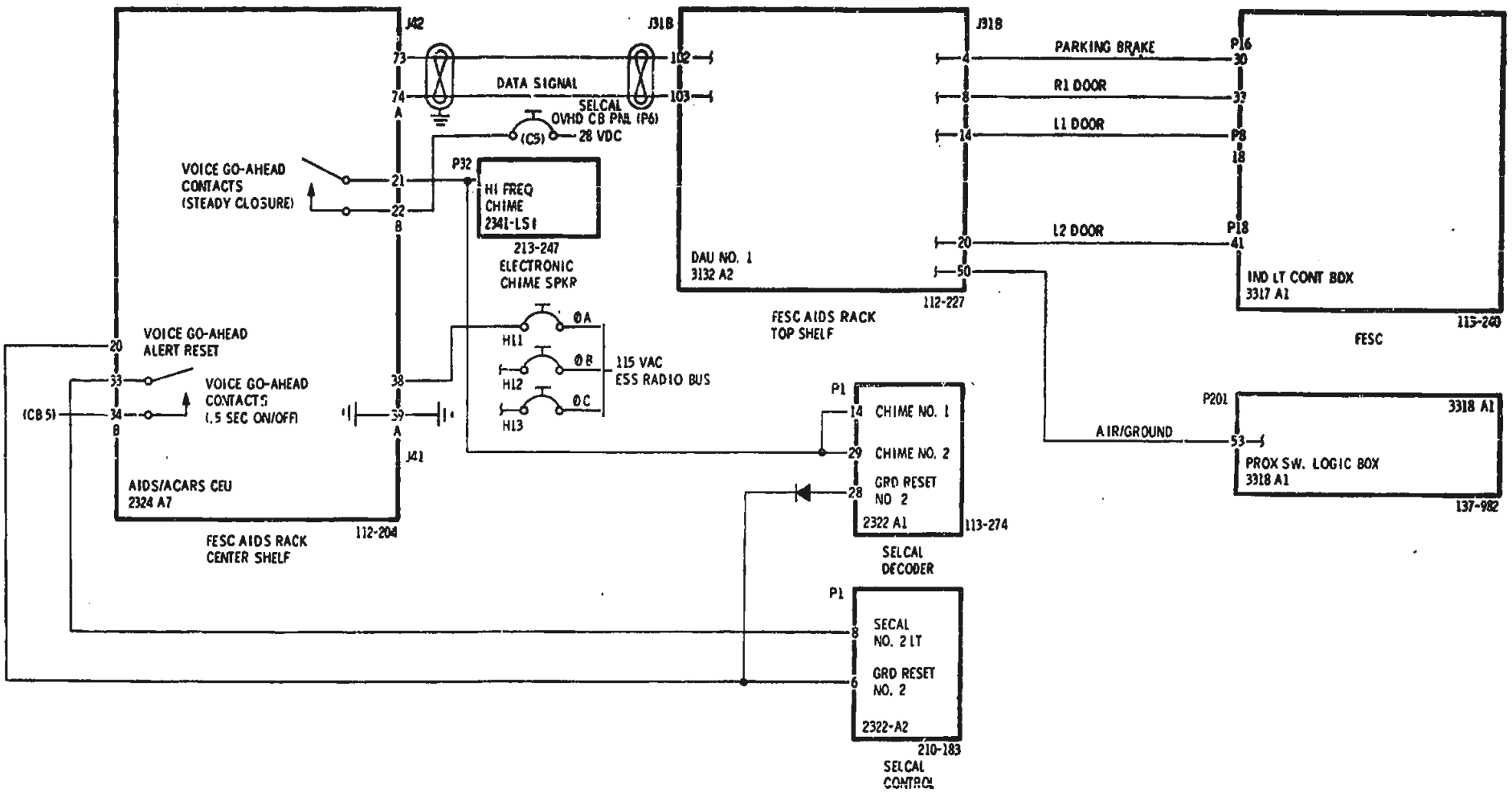
R EFFECTIVITY: ALL
R
001B



CR
CR

ACARS Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: ALL
R
001B



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CR
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ACARS Schematic
SCHEM 1 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

CR

ACARS SYSTEM - ADJUSTMENT/TEST

CR 1. General

CR This section contains procedures for performing an operational
CR test and a system test of ACARS (Aircraft Communications
CR Addressing and Reporting System).

CR A. The operational test verifies proper operation of ACARS in a
CR minimum of time, using only equipment installed in the
CR airplane.

CR B. The system test increases the scope of the operational test
CR to provide all performance requirements of the system.

CR 2. Operational Test - ACARS

CR A. Referenced Procedures

CR (1) 23-23-00/501 VHF Communications System

CR (2) 24-22-00 Electrical Power

CR (3) 23-22-00/501 SELCAL System

CR B. Prepare to Test

CR (1) This test requires an ARINC ground station tied to
CR ACARS.

CR (2) Provide electrical power (Ref. 24-22-00)

CR (3) Verify the following are operational:

CR (a) VHF No. 3 Communications System (Ref. 23-23-00)

CR (b) SELCAL System (Ref. 23-22-00)

CR (4) Check that AIDS/FLT RCDR ϕA on Flight Engineers Aft
CR Circuit Breaker Panel is closed.

CR (5) Check that AIDS ACARS BAT/CLK on the center Overhead
CR Circuit Breaker Panel is closed.

CR (6) Check that Parking Brake is set.

CR C. Test ACARS

CR (1) Press LINK TEST on ACARS control unit (CU), on F/E
CR upper panel. Observe the following sequential events:

CR (a) LINK TEST lights up.

CR NOTE: All CU pushbutton switches have
CR backlighting (except DATA MODE, VOX MODE,
CR and SEND).

CR (b) The left four display digits (all segments) light
CR up for about a second.

CR (c) The right four display digits (all segments) light
CR up for about a second.

CR (d) The eight other function selectors (blocked with
CR LINK TEST), and the status indicators (VOX BUSY,
CR CU FAIL, MU FAIL, and NO COMM) light up for about
CR a second.

CR NOTE: If AIDS/ACARS CEU or CU fail bite tests the
CR appropriate MU FAIL or CU FAIL annunciator
CR remains lit.

CR (e) After lamp tests, the SELCAL aural warning chime
CR activates and SELCAL-2 light on SELCAL control
CR panel starts flashing. Reset by momentarily
CR depressing SELCAL-2 light.

CR (f) After SELCAL test, SEND lights up for a minimum of
CR two seconds (test message being sent).

CR (g) If test successful (message ackknowledged), the
CR following occurs:

CR 1) SEND extinguishes (on CU).

CR 2) LINK TEST dims.

CR (2) Perform GMT update as follows:

CR NOTE: This procedure must be done if AIDS/ACARS CEU is
CR replaced, system has been placarded inoperative
CR and breakers pulled or ships battery has been
CR removed for maintenance and replaced.

CR (a) Press MISC on ACARS control unit (CU) on F/E upper
CR panel. Display shows _ _ _ _ _ _ 0 0.

CR (b) Press 8 on numeric keyboard. Display shows 08.

CR (c) Press ENT key. Display shows G M T _ X X X X.
CR (Where XXXX is time in hours and minutes elapsed
CR since ACARS power was first turned on after unit
CR is changed).

CR (d) Press ENT again. MISC light goes out and SEND
CR light comes on. (ACARS sends message to ARINC
CR requesting GMT time).

CR (e) If uplink GMT update message received, the
CR following occurs;

CR 1) Display shows X X, X X, X X (GMT in hours,
CR minutes, and seconds and continuing to count).

CR 2) SEND light goes out.

CR D. Remove electrical power if no longer required.

CR 4. System Test - ACARS

CR A. Reference Precedures

CR	(1)	23-23-00/501	VHF Communication System
CR	(2)	24-22-00	Electrical Power
CR	(3)	23-22-00/501	SELCAL System
CR	(4)	23-51-00/501	Audio Integrating System
CR	(5)	32-48-00/501	Parking Brake System
CR	(6)	52-71-00/501	Door Warning System
CR	(7)	31-32-10	Air/Ground Sensor Monitoring System

CR B. Prepare to test

CR (1) This test requires an ARINC ground station tied to
CR ACARS.

CR (2) Provide electrical power (Ref. 24-22-00).

CR (3) Verify the following are operational:

CR (a) VHF No. 3 Communications Systen (Ref. 24-22-00)

CR (b) SELCAL System (Ref. 23-22-00)

CR (c) Audio Integrating System (Ref. 23-51-00)

CR (d) Parking Brake System (Ref. 32-48-00)

CR (e) Door Warning System (Ref. 52-71-00)

CR (f) Air/Ground Sensor Monitoring System (Ref.
CR 31-32-10)

CR (4) Check that AIDS/FLT RCDR ϕA on Flight Engineer's Aft
CR Circuit Breaker Panel is closed.

CR (5) Check that AIDS ACARS BAT/CLK on the Center Overhead
CR Circuit Breaker Panel is closed.

CR (6) Check that parking brake is set.

CR (7) Select DATA on ACARS Control Unit (CU) on F/E panel.

CR (8) This test requires an ARINC ground station tied to
CR ACARS:

CR (a) Press LINK TEST on ACARS Control Unit (CU), on F/E
CR panel.

CR (b) If NO COMM lights up at end of test (the test
CR consists of three groups of CU panel lights coming
CR on sequentially, followed by SEND lighting up),
CR then the system test cannot be completed.

CR C. Test ACARS

CR NOTE: Unless otherwise specified all controls and reactions
CR are on the ACARS CU, on the F/E upper panel.

CR (1) Temporarily deactivate AIDS/FLT RCDR ϕA and AIDS/ACARS
CR BAT/CLK circuit breakers. Reactivate both circuit
CR breakers.

CR (2) Check both lights on the MU are out.

CR (3) Check the following on the CU:

CR (a) Display reads INITIALIZ.

CR (b) All pushbutton switches have backlighting (except
CR DATA MODE, VOX MODE, and SEND).

CR (c) Only DATA MODE is brightly lit.

CR (d) Status indicators (VOX BUSY, MU FAIL, CU FAIL, and
CR NO COMM) not lit.

CR (4) Rotate inner BRT knob and check intensity of pushbutton backlighting varies.

CR (5) Rotate outer BRT knob and check intensity of activated switches and display varies.

CR (6) Open AIDS/FLT RCDR ϕA circuit breaker on F/E Aft Circuit Breaker panel for one minute; then close.

CR (7) Press GMT (Greenwich Mean Time).

CR (8) Check that time since AIDS/FLT RCDR ϕA circuit breaker was opened and closed is displayed in hours, minutes, and seconds, and is continuing to count.

CR (9) Press LINK TEST, and observe the following sequential events:

CR (a) LINK TEST lights up.

CR (b) The left four display digits (all segments) light up for about a second.

CR (c) The right four display digits (all segments) light up for about a second.

CR (d) The eight other function selectors (blocked with LINK TEST), and the status indicators light up for about a second.

CR (e) After lamp tests, the SELCAL aural warning chime activates and SELCAL-2 light on SELCAL control panel starts flashing. Reset by momentarily depressing SELCAL-2 light.

CR (f) After SELCAL test, SEND lights up for a minimum of two seconds (test message being sent).

CR (g) If test successful (message acknowledged), the following occurs:

CR 1) SEND extinguishes.

CR 2) LINK TEST dims.

CR (10) Perform GMT update as follows:

CR NOTE: This procedure must be done if MU is replaced or ships battery has been removed for maintenance and replaced.

CR (a) Press MISC on ACARS control unit (CU) on F/E upper
CR panel. Display shows _ _ _ _ _ _ 0 0.

CR (b) Press 8 on numeric keyboard. Display shows 08.

CR (c) Press ENT key. Display shows G M T _ X X X X.
CR (Where XXXX is time in hours and minutes elapsed
CR since ACARS power was first turned on after unit
CR change).

CR (d) Press ENT again. MISC light goes OUT and SEND
CR light comes ON. (ACARS sends message to ARINC
CR requesting GMT time).

CR (e) If uplink GMT update message is received, the
CR following occurs;

CR 1) Display shows X X, X X, X X (GMT in hours,
CR minutes, and seconds and continuing to count).

CR 2) SEND light goes out.

CR (11) Press CLR, and check that display clears.

CR (12) Press GMT, and check that correct GMT is displayed.

CR (13) Check Aircraft I.D. Prompt sequence as follows:

CR	Press MISC	_ _ _ _ _ _ 0 0
CR	Press Alpha Character ID	- - - - - - I D
CR	Press ENT	P G M _ T W S 0
CR	Press ENT	_ _ _ _ _ _ T W
CR	Press ENT	_ . N 1 1 0 0 5 *
CR	Press ENT	_ _ _ _ _ G N D
CR	Press ENT	0 0 0 0 1 1 0 0 **
CR	Press ENT	C A P / F O _ 1
CR	Press ENT	X C V R 3 _ _ N
CR	Press ENT	C T L H E D _ Y
CR	Press ENT	V O G O R S _ N
CR	Press ENT	P T R _ _ 1 1 1

CR Press ENT. Display blanks and MISC pushbutton light
CR goes out.

CR * Aircraft FAA Registry Number (Tail Number)
CR should be same as aircraft on which installed.

CR ** Parking Brake set; L1 Door open; L2, R1 Doors
CR closed.

CR (14) Press MISC and ID again and accomplish the following:

CR Step thru prompts by successively pressing ENT 5 times;

CR Exercise parking brake and specific doors and verify
CR that respective display window sensor status is as
CR shown below:

CR 0 0 0 0 1 1 1 1 *

CR 0 0 0 0 1 1 1 1 R1 Door

CR 0 0 0 0 1 1 1 1 L2 Door

CR 0 0 0 0 1 1 1 1 L1 Door

CR 0 0 0 0 1 1 1 1 Parking Brake

CR * Not Used - Always shows 0
CR Display status of IN/OUT sensors
CR 1 = Door closed or parking brake released
CR 0 = Door open or parking brake set

CR (15) Press INIT (Initialization) and F L T _ 0 0 0 0 is
CR displayed.

CR (16) Key in 8888, and ENT. D E P _ _ / / / is displayed.

CR (17) Operate STATION slew switches to arrange display of
CR MKC, and press ENT. D E S _ _ / / / is displayed.

CR (18) Operate STATION slew switches to arrange display of
CR MSP, and press ENT. F U E L 0 0 0 0 is displayed.

CR (19) Key in 275, and ENT. E T E _ 0 0 0 0 is displayed.

CR (20) Key in 140, and ENT. Display clears and INIT dims.

CR (21) Press INIT and ENT and check that F L T _ 8 8 8 8 is
CR displayed.

CR (22) Press ENT, and check that D E P _ _ M K C is displayed.

CR (23) Press ENT, and check that D E S _ _ M S P is displayed.

CR (24) Press ENT, and check that F U E L 0 2 7 5 is displayed.

CR (25) Press ENT, and check that E T E _ 0 1 4 0 is displayed.
CR Press ENT and display clears. INIT dims.

CR (26) Press ETA, and E T A _ _ N / A is displayed. Press
CR ETA, ETA dims.

CR (27) Press DLA, and ENT and O N O _ 0 0 0 0 is displayed.
CR Press ENT, and A W G _ 0 0 0 0 is displayed. Press
CR ENT, and E F C _ 0 0 0 0 is displayed. Press ENT, and
CR E A C _ 0 0 0 0 is displayed. Press ENT and display
CR clears. DLA dims.

CR (28) Press FUEL, and ENT. F U E L _ N / A is displayed.
CR Press FUEL; FUEL dims.

CR (29) Press WX, and ENT. W X _ _ _ M S P is displayed.
CR Press WX; WX dims.

CR (30) Press GND ADRS and ENT. C O D E _ _ 0 0 is displayed.
CR Press GND ADRS; GND ADRS dims.

CR (31) Press AIDS and ENT. A I D S _ _ 0 0 is displayed.
CR Press AIDS; AIDS dims.

CR (32) Activate 000I sensors as follows:

CR (a) Press GMT and check GMT is displayed.

CR (b) Close passenger doors L1, L2, and R1 or simulate
CR closed door condition by installing artificial
CR sensor target (MM 20-31-01).

CR (c) At the turn of a minute on GMT display, release
CR parking brake or deactivate parking brake light by
CR pulling its release. Record time as OUT time.

CR (d) Perform aricraft airborne simulation procedure per
CR L1011 Maintenance Manual 32-63-00, pages 201/202,
CR Para. 4A. At the CU, push MISC key and set up ID
CR via slew switches. Press ENT four times; display
CR should show _ _ _ _ G N D. Display should
CR change to AIR when air/ground alum. sensor shims
CR are in place. Observe GMT display and record time
CR as OFF time.

CR (e) Press ETA and ENT. D E S _ _ M S P is displayed.
CR Press ENT and E T A _ X X X X is displayed.
CR (Where XXXX is ETE entered at initialization plus

CR OFF GMT time. For example, the 1 hour and 40
CR minutes entered at ETE is added to recorded off
CR time). Press ETA; ETA goes out and display
CR clears.

CR (f) Wait at least one minute, then at the turn of a
CR minute return to the ground condition by
CR performing L1011 Maintenance Manual 32-63-00, Page
CR 202, Para. 2.B. Recall air/ground status display
CR per para. (d) above; display shows _ _ _ _ _ A I
CR R. Display should change to GND when air/ground
CR sensor shims are removed. Observe GMT display and
CR record time as ON time.

CR (g) Wait at least two minutes, then at the turn of a
CR minute on GMT display, set parking brake and
CR record time as IN time.

CR (h) Open L1 door and remove artificial sensor target
CR and note that SEND light comes ON. (Transmission
CR of IN message). SEND goes off after ground
CR acknowledgement.

CR (33) Press and hold OUT, and check that hour-minute display
CR agrees with recorded OUT time.

CR (34) Press and hold OFF, and check that hour-minute display
CR agrees with recorded OFF time.

CR (35) Press and hold ON, and check that hour-minute display
CR agrees with recorded ON time.

CR (36) Press and hold IN, and check that hour-minute display
CR agrees with recorded IN time.

CR (37) At F/E audio control panel, select VHF-3 audio and
CR headset. Activate the VHF-3 microphone pushbutton.

CR (38) At the ACAR CU select DATA at the DATA switch light.
CR Verify that VHF-3 will not transmit, ie, no sidetone
CR heard on headset while speaking into microphone.

CR (39) At VHF-3 radio control panel, select local ATIS
CR frequency (128.35 at MCI) or other authorized channel.

CR (40) At ACARS CU PRESS VOX MODE. Active channel audio
CR should be audible on the headset.

CR (41) At ACARS CU press DATA mode. DATA mode illuminates
CR steady, the VOX mode light goes out and the activated
CR voice channel is no longer heard.

CR (42) Select an authorized VHF test frequency on VHF-3 COMM
CR control panel. Press VOX MODE on ACARS CU and verify
CR that VHF-3 can be used for voice communication.

CR (43) Press DATA MODE. Open VHF No. 3 circuit breaker on
CR center pilots overhead circuit breaker panel.

CR (44) Press LINK TEST. Check that NO COMM lights
CR approximately two minutes after test sequence.

CR (45) Close VHF No. 3 circuit breaker.

CR (46) Press SEND. Check that NO COMM extinguishes.

CR (47) Press GMT. At a specific time on GMT display, open
CR AIDS/FLT RCDR ϕA Circuit Breaker on F/E aft circuit
CR breaker panel.

CR (48) Check that all CU switches and display extinguish.

CR (49) Wait two minutes, close AID/FLT RCDR ϕA circuit
CR breaker.

CR (50) Check GMT is displayed without loss of time and DATA
CR MODE is illuminated.

CR (51) Press INIT and check, by successive activation of ENT,
CR DEP station displays MSP and DES station displays ///.

CR D. Remove electrical power if no longer required.

CR # ACARS CONTROL PANEL - REMOVAL/INSTALLATION

CR 1. Referenced Procedure

CR 23-24-00 Page 501 ACARS Operational Test - Adjustment and Test

CR 2. Removal/Installation

CR A. Removal

CR (1) On Flight Engineer's Aft Circuit Breaker Panel, open and tag AIDS/FLT RCDR ϕA circuit breaker.

CR (2) At Flight Engineer's panel, remove ACARS Control Panel.

CR B. Installation

CR (1) Verify that circuit breaker opened in Step 2.A.(1) is open and tagged.

CR (2) At Flight Engineer's panel, install ACARS Control Panel.

CR (3) Remove tags and close circuit breaker opened in Step 2.A.(1).

CR C. Test ACARS control unit installation:

CR (1) Provide electrical power.

CR (2) Turn outer BRT knob on control unit clockwise.

CR (3) Observe that brightness of displays, indicators, and pushbuttons on control unit increases.

CR (4) Turn outer BRT knob counterclockwise.

CR (5) Observe that brightness of displays, indicators, and pushbuttons on control unit decreases.

CR (6) Perform an operational test of ACARS. (Ref. 23-24-00, Page 501).

CR (7) Remove electrical power if no longer required.

CR

AIDS/ACARS CEU - REMOVAL/INSTALLATION

CR 1. Referenced Procedure

CR 23-24-00 Page 501 ACARS Operational Test - Adjustment and Test

CR 2. Removal/Installation

CR A. Removal

CR (1) On Flight Engineer's Aft Circuit Breaker Panel, open CR and tag AIDS/FLT RCDR ϕA circuit breaker.

CR (2) In the FESC, at the LH AIDS rack, locate the AIDS/ACARS CR CEU on the center shelf.

CR (3) Depress CEU locking lever releases in CEU handles and CR pull levers down to release latches and disengage CR electrical connectors at rear of CEU.

CR (4) Using the handles, slide CEU out of mounting tray.

CR (5) Return locking levers to their stowed positions in the CR handles.

CR B. Installation

CR (1) Verify that circuit breaker opened in Step 2.A.(1) is CR open and tagged.

CR (2) Install AIDS/ACARS CEU on LH AIDS rack mounting tray in CR the FESC and carefully slide CEU into tray until the CR connector guide pins engage.

CR (3) Depress locking lever releases in CEU handles and pull CR levers down to engage latches.

CR (4) Return locking levers to their stowed positions.

CR (5) Remove tags and close circuit breaker opened in Step CR 2.A.(1).

CR (6) When AIDS/ACARS CEU is replaced, perform the following CR procedures:

CR (a) Perform an AIDS system operational test per CR 31-32-00 Page 501/502.

CR
CR (b) Perform an ACARS system operational test per 23-24-00 Page 501/502/503.

PASSENGER ADDRESS, ENTERTAINMENT AND SERVICE DESCRIPTION AND OPERATION

1. General

The passenger address, entertainment, and service equipment includes the following:

Passenger Address System (Ref. 23-31-00)

R Passenger Audio Entertainment and Service System.

Passenger Visual Entertainment System (Ref. 23-34-00)

Boarding Music System (Ref. 23-35-00).

Figure 1 is an interconnection block diagram of the passenger address (PA), entertainment, and service system.

The PA system enables the flight crew to make announcements to the passengers over a speaker system located throughout the cabin and lavatory areas.

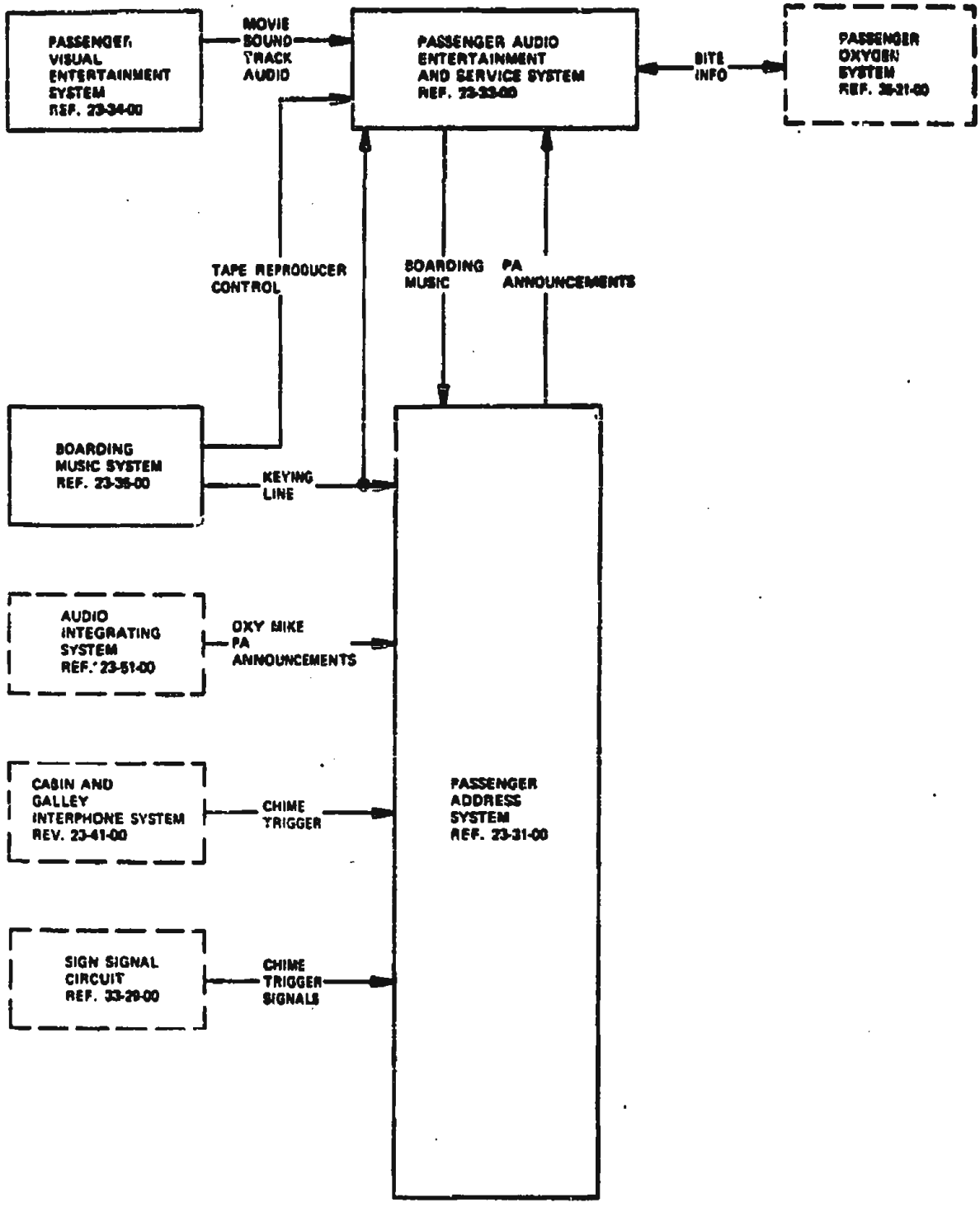
Announcements can be made from the flight station or cabin attendant positions. An electronic chime circuit in the PA equipment interfaces with three systems.

R A. Passenger call (Ref. 33-26-00)

B. Ordinance Sign Lighting (Ref. 33-29-00).

C. Cabin and Galley Interphone (Ref. 23-41-00). When any one of these services is used, the chime circuit is triggered and produces tones over the PA speaker system thereby alerting the passengers and/or attendants.

Audio entertainment provided by a multiple track tape reproducer can be heard by the passengers through headsets at each seat position. Each passenger has a selectable choice of stereo and/or monaural programs. Movie soundtrack audio from the passenger visual entertainment system is included in the audio entertainment selection. The tape and soundtrack audio is distributed to the passenger seats through a pulse code modulation multiplexing system. The passenger address system interfaces with the audio entertainment system so that PA announcements can override all audio channels and be heard over the headsets as well as through the PA speaker system.


PASSENGER VISUAL ENTERTAINMENT SYSTEM REF. 23-34-00
MOVIE SOUND TRACK AUDIO
PASSENGER AUDIO ENTERTAINMENT AND SERVICE SYSTEM REF. 23-33-00
BITE INFO
PASSENGER OXYGEN SYSTEM REF. 35-21-00
TAPE REPRODUCER CONTROL
BOARDING MUSIC
PA ANNOUNCEMENTS
BOARDING MUSIC SYSTEM REF. 23-35-00
KEYING LINE
AUDIO INTEGRATING SYSTEM REF. 23-51-00
OXY MIKE PA ANNOUNCEMENTS
CABIN AND GALLEY INTERPHONE SYSTEM REV. 23-41-00
CHIME TRIGGER
PASSENGER ADDRESS SYSTEM REF. 23-31-00
SIGN SIGNAL CIRCUIT REF. 33-29-00
CHIME TRIGGER SIGNALS

M1-7802-23-102

R Passenger Address, Entertainment, and Service
R System Interconnection Block Diagram
R Figure 1

EFFECTIVITY: ALL

The passenger service system (reading lights, passenger call circuit, and individual air outlets) is operated through a pulse code modulation system interfacing with the audio entertainment system. Each seat has controls for each service. Built-in test equipment (BITE), used to test the passenger audio entertainment and service system is also used to test the passenger oxygen system.

Passenger visual entertainment is provided by three movie projectors located in three separate areas of the cabin. The soundtracks from each projector interface with the passenger audio entertainment system so that movie audio can be heard through the passenger headsets.

The boarding music system provides audio entertainment in the cabin for the passengers during on and off loading periods. The audio entertainment system tape reproducer supplies the boarding music to the PA system.

PASSENGER ADDRESS SYSTEM - DESCRIPTION AND OPERATION

1. General

R The passenger address (PA) system is used by flight crewmembers to make announcements over a network of speakers throughout the R cabin, galley, and lavatory areas. The PA system provides chime tone alert signals, and amplification and reproduction of music from the boarding music system (Ref. 23-35-00).

Passenger Address System equipment is located throughout the R aircraft (Ref. Fig. 1). The PA system includes the following components:

On aircraft 001-031,
two identical amplifiers located in the forward electronic service center (FESC), on the rear rack lower shelf, zone 113. A PASSENGER ADDRESS CONTROL PANEL on the pilots overhead panel in the flight station, zone 210. Four PA microphones, one in the flight station, left forward, mid, and left aft cabin attendants panels, zones 210, 223, 250, and 271, respectively.

On aircraft 032-999,
two identical amplifiers located in the forward electronic service center (FESC), on the rear rack lower shelf, zone 113. A PASSENGER ADDRESS CONTROL PANEL on the pilots
R overhead panel in the flight station, zone 210. 10 PA
R microphones, one each in the flight station, the forward,
R mid and aft attendant panels and at each attendants seat position at the R1, L2, R2, L3, R3 and R4 doors.

Forty 8-inch speakers located in ceiling panels throughout the passenger compartment, zones 225 through 274; and on the lower galley forward ceiling, zone 131

Twenty-two 4-inch speakers, located in ceiling panels in the flight station, zone 216; throughout the passenger compartment, zones 225 through 274; in each lavatory, zones 221, 222, and 281-285; and in the lower galley, zone 135

Fifty speaker line transformers, zones 135, and 216 through 285

Ten FIRST CLASS/COACH transfer switches, located above the ceiling panels adjacent to the speakers in zones 230 through 250

Passenger address switchlights, VU meters, and PA IN USE lights located on the left forward, mid, and left aft cabin
R attendants panels, zones 223, 250, and 271, respectively.

R The two PA amplifiers are interconnected so that each amplifier
R drives a separate section of speakers. The No. 1 PA amplifier drives speakers located in the first section of the aircraft, the two forward lavatory speakers, and the lower galley
R speakers. The No. 2 PA amplifier drives speakers located in the coach section of the aircraft and the five aft lavatory
R speakers. A single PA speaker, driven by No. 1 or No. 2 PA
R amplifier (depending upon cabin selection), is located in the flight station for monitoring purposes. A dual installation circuit interfaces the No. 1 amplifier with the No. 2 amplifier. When a combined first class and coach operational mode is selected from a cabin attendants position, or if boarding music is selected (Ref. 23-35-00), the dual installation circuit carries No. 1 amplifier audio to the No. 2 amplifier. This is also true for a low-chime mode of operation (Ref. 33-29-00).

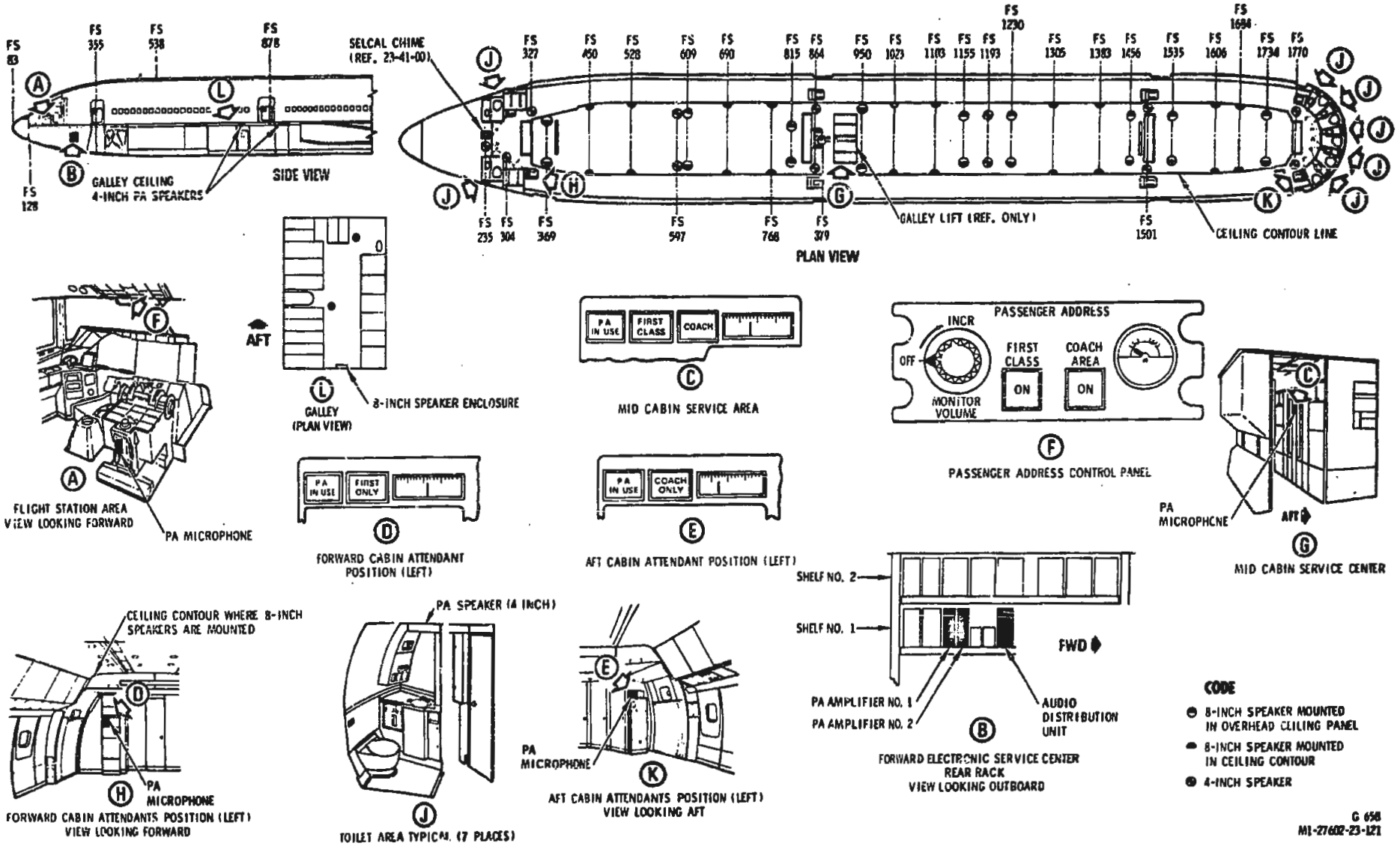
R When flight station PA microphone mode is selected, the dual installation circuit is opened and audio is carried from the No. 1 amplifier to the No. 2 amplifier through the sidetone circuit.

Ten FIRST CLASS/COACH speaker switches are located above the ceiling panels at FS 597, 609, 690, 768, 815, 864, 950, 1023, 1103, and 1155. The function of each switch is to transfer the
R adjacent PA or chime speakers from one amplifier to the other when the class divider is moved to a new cabin position.

For normal operation, all switches in the coach section are set to the COACH position and all switches in the first class area are set to the FIRST CLASS position. When all switches are set
R to the COACH position, the two forward lavatory PA speakers and
R the eight forward PA speakers remain connected to amplifier No.
R 1. All other PA speakers are connected to amplifier No. 2.
R Both PA amplifiers also provide electronic chime tone signals which are triggered by passenger service calls, ordinance signs, and interphone dialing circuits. The chime signals are
R amplified by auxiliary amplifiers within the PA amplifiers and applied to 12 chime speakers located throughout the passenger
R areas. In addition to relaying announcements and chime tones,
R PA system interfaces with the boarding music system to provide
R passenger audio entertainment. Interconnection of PA components is made through the audio distribution unit (Ref. 23-51-00) which contains the relay logic and impedance matching networks.

R The priority switching of PA announcements, and the areas serviced from each position are as follows:

A. Captains Oxygen Mask Microphone - First Priority



R
R Passenger Address System
Figure 1

EFFECTIVITY: ALL

R Announcements made from the Captains oxygen mask microphone will override all other inputs to the PA system. Depressing the FIRST CLASS and/or COACH AREA switchlight(s) on the PASSENGER ADDRESS CONTROL PANEL (pilots overhead panel) R allows PA announcements to be made to the corresponding area(s). If the FIRST CLASS or COACH AREA switchlight is depressed, the Captains oxygen mask microphone input will R override PA announcements being made to that area.

B. First Officers Oxygen Mask Microphone - Second Priority

R Announcements made from the First Officers oxygen mask microphone will override all other PA system inputs except inputs from the Captains oxygen mask microphone. Area selection is the same as for the Captains oxygen mask microphone.

R C. Flight Station PA Microphone - Third Priority

R Announcements made from the flight station PA microphone
R will override all other PA system inputs except inputs from the Captains or First Officers oxygen mask microphone. Area selection is the same as for the Captains and First Officers oxygen mask microphones.

Passenger Address System Override Priority (001-031)
Table 1

	WILL OVERRIDE:			
VOICE SIGNAL FROM:	FLT. STATION (1)	L1 DOOR (2)	L4 DOOR (3)	UPPER GALLEY (4)
FLT. STATION	----	YES	YES	YES
L1 DOOR	NO	----	YES	YES
L4 DOOR	NO	NO	----	YES
UPPER GALLEY	NO	NO	NO	----

Passenger Address System Override Priority (032-999)
Table 1

		WILL OVERRIDE (PRIORITY)					
R R	VOICE SIGNAL FROM:	FLT. STAT. (1)	L1 DOORS (2)	R1 L2 R2 DOORS (4)	L3 R3 R4 DOORS (4)	L4 DOORS (3)	Like priorities are electrically paralleled
	FLT. STATION	----	YES	YES	YES	YES	
	L1	NO	----	YES	YES	YES	
	R1, L2, R2	NO	NO	----	----	NO	
	L3, R3, R4	NO	NO	----	----	NO	
	L4	NO	NO	YES	YES		

R D. Left Forward Cabin Attendants PA Microphone - Fourth Priority

R R R R Announcements made from the left forward cabin attendants PA microphone will override all other PA system inputs except inputs from any of the three microphones in the flight station. Depressing the FIRST ONLY switchlight allows PA announcements to be made to the first class area only. If the FIRST ONLY switchlight is released, announcements made R R from the left forward cabin attendants PA microphone will be carried over speakers in all areas. If a PA announcement is being made from one of the three microphones in the flight station to the coach area only, the left forward cabin R attendants PA microphone can be used to make announcements to the first class area only by depressing the FIRST ONLY switchlight.

R E. Left Aft Cabin Attendants PA Microphone - Fifth Priority

R R R R R Announcements made from the left aft cabin attendants PA microphone will override all other PA system inputs except inputs from one of the three flight station microphones or the left forward cabin attendants PA microphone. Depressing the COACH ONLY switchlight allows PA announcements to be made to the coach area only. If the COACH ONLY switchlight is released, announcements made from the left aft cabin R attendants PA microphone will be carried over speakers in R all areas. If a PA announcement is being made from a higher priority position to the first class area only, the left aft R cabin attendants PA microphone can be used to make

announcements to the coach area only by depressing the COACH ONLY switchlight.

R F. Mid Cabin Service Area PA Microphone - Sixth Priority

R Announcements made from the mid cabin service area PA microphone will override boarding music inputs only. Depressing the FIRST CLASS and/or COACH switchlight(s) R allows PA announcements to be made to the corresponding R area(s). If a PA announcement is being made from a higher R priority position to either the first class or coach area R only, the mid cabin service area PA microphone can be used to make announcements to the other area by depressing the corresponding switchlight.

On aircraft 032-999, microphones at the R1, L2, R2, L3, R3 and R4 attendant positions have the lowest priority (Ref. Table 1) and will override prerecorded announcements and boarding music only.

G. Boarding Music - Seventh Priority

R Boarding music inputs to the PA system will be overridden by R inputs from any of the microphones which can be used to make R PA announcements. If a PA announcement is being made to R either the first class or coach area only, boarding music R will not be overridden in the other area.

R Three PA IN USE lights, located one each at the attendant R microphone positions, come on when the PA is keyed from any of R the microphone positions. A VU meter located at each PA announcement station gives a loudness indication to the announcer. An OFF/INCR MONITOR VOLUME control located on the flight station Control Panel provides a volume control with an off position for the flight station area speaker only.

To compensate for increased ambient noise when the aircraft is R airborne, the audio level of both amplifiers (for chime and PA) is automatically increased by switching a ground return through the landing gear air/ground sensing relay No. 3 (Ref. 32-63-00). When in the airborne position, this relay operates to double the R output power of each PA amplifier, and changes the VU meter circuit in the audio distribution unit.

R The PA system can be operated any time power is on the buses and the MASTER RADIO - ESSENTIAL switchlight is depressed (pilots overhead panel), or the BATTERY switch is on (FE/SO panel). There is no system on/off control.

R To make an announcement from a PA microphone, the area switchlights are selected as required and the applicable press-to-talk (PTT) switch is operated to key the circuit for

operation. When announcements are made from the oxygen microphones, the PA on OXY switchlight is selected and the PRESS TO TALK switch on the headset stowage and microphone selector console is used. All announcements made from the flight station microphones are routed by the amplifiers over the chime speakers
R as well as the PA speakers.

R If more than one microphone station attempts to operate the PA system simultaneously, priority is determined by the amplifiers and the audio distribution unit relay logic circuits. Priority of operation also applies to the boarding music input.

R The PA amplifier auxiliary amplifier oscillator circuits generate three tones. Each tone is heard only once after being triggered into operation by the presence and/or absence of a 28V dc pulse. These tones and their functions are as follows:

High tone - indicates that a passenger has operated a passenger call button (Ref. 23-33-00) and requires an attendants service. The high tone may also be activated by the CALL - SIGNAL switch located on the flight station CABIN INTERPHONE panel (Ref. 23-41-00). The flight crew can use this switch to set up any coded chime call to the cabin area, as required.

Low tone - indicates that the NO SMOKING and/or the FASTEN SEAT BELT signs have been switched on or off (Ref. 33-29-00).

High tone followed by a low tone - indicates that the cabin and galley interphone system (Ref. 23-41-00) has been operated and one crewmember is calling another.

The chime speakers are connected in series-parallel circuits.
R As in the PA speaker system, the No. 1 amplifier drives the first class area chime speakers, and the No. 2 amplifier drives the coach area chime speakers (Ref. Fig. 2). This circuit arrangement enables calls which operate the high or high/low chime circuits to be directed to the cabin area (first class or coach) where attendant attention is required.

An INTERPHONE CHIME - FIRST CLASS DIVIDER switch is located above the ceiling panel at FS 1163. In the NORM position, FIRST CLASS selected interphone calls from the flight station will actuate HI/LO chimes only on chime speakers in the FIRST CLASS area; if the CHIME - FIRST CLASS DIVIDER switch is placed in the
R opposite position, PA amplifiers NO. 1 and NO. 2 are keyed together actuating HI/LO chimes throughout both FIRST CLASS and COACH areas.

R During low-tone chime operation (posted signs), the PA amplifier
R routes the low-tone chime over the PA speakers. If the PA

speakers are in use, the low-tone signal is superimposed on the other audio.

R In the event of the No. 1 PA amplifier failing, the No. 2 PA
R amplifier will continue to operate for:

R A. PA announcements made to the coach area from PA microphone positions with a coach area selection

B. Passenger service calls (high chime) in coach area

C. Cabin interphone calls (high/low chime) directed to coach area

D. NO SMOKING and FASTEN SEAT BELTS operation (low chime) in coach area

R In the event of the No. 2 PA amplifier failing, the No. 1 PA
R amplifier will continue to operate for:

R A. PA announcements made to first class area from all positions

B. Passenger service calls (high chime) in first class area

C. Cabin interphone calls (high/low chime) directed to first class area

D. NO SMOKING and FASTEN SEAT BELTS operation (low chime) in first class area

R Power to operate the PA system is supplied by the essential communication 28V dc bus. Circuit protection is provided by
R circuit breakers PA NO. 1 (A15) and PA NO. 2 (A16) located on the pilots overhead circuit breaker panel CB1, zone 210.

Two 2-position test switches and a meter are located on the
R front panel of each PA amplifier. One switch has positions labeled NORM and SPKR TEST. The other switch has positions labeled NORM and CAL, it is spring-loaded to the NORM position. The meter is graduated from +3 to -20 db. With both switches in the NORM position, the meter is connected across the speaker
R load. In the CAL position, the PA speakers are disconnected and the amplifier is connected to an internal (maximum) dummy load. In the SPKR TEST position, a test tone is applied to the speaker system.

2. Operation

R A. Flight Station PA Microphone Mode

When the flight station FIRST CLASS switch is depressed and latched, a ground return is applied to the switchlight lamp and to the audio distribution unit (ADU) relay logic circuit (Ref. Fig. 2). The switchlight comes on and the relay
R circuit operates to interface the PA microphone to the No. 1
R PA amplifier. Pressing the PA microphone press-to-talk (PTT) switch enables the ADU relay logic circuit, which in turn keys the No. 1 input to amplifier No. 1. Keying the amplifier triggers a solid-state switching circuit to pass input No. 1 audio to the amplifier circuits, and to inhibit audio from lower priority inputs. This gives third priority
R to the flight station PA microphone. The ADU relay logic circuit opens the dual-amplifier installation circuit.

R Microphone audio is routed to the No. 1 PA amplifier through
R the ADU relay logic circuit. In the No. 1 PA amplifier, the audio signals are amplified and applied to the main and auxiliary amplifier outputs. The main amplifier audio
R signals drive the first class section of PA speakers and the two forward lavatory speakers. The auxiliary amplifier audio signals drive the first class chime speakers.

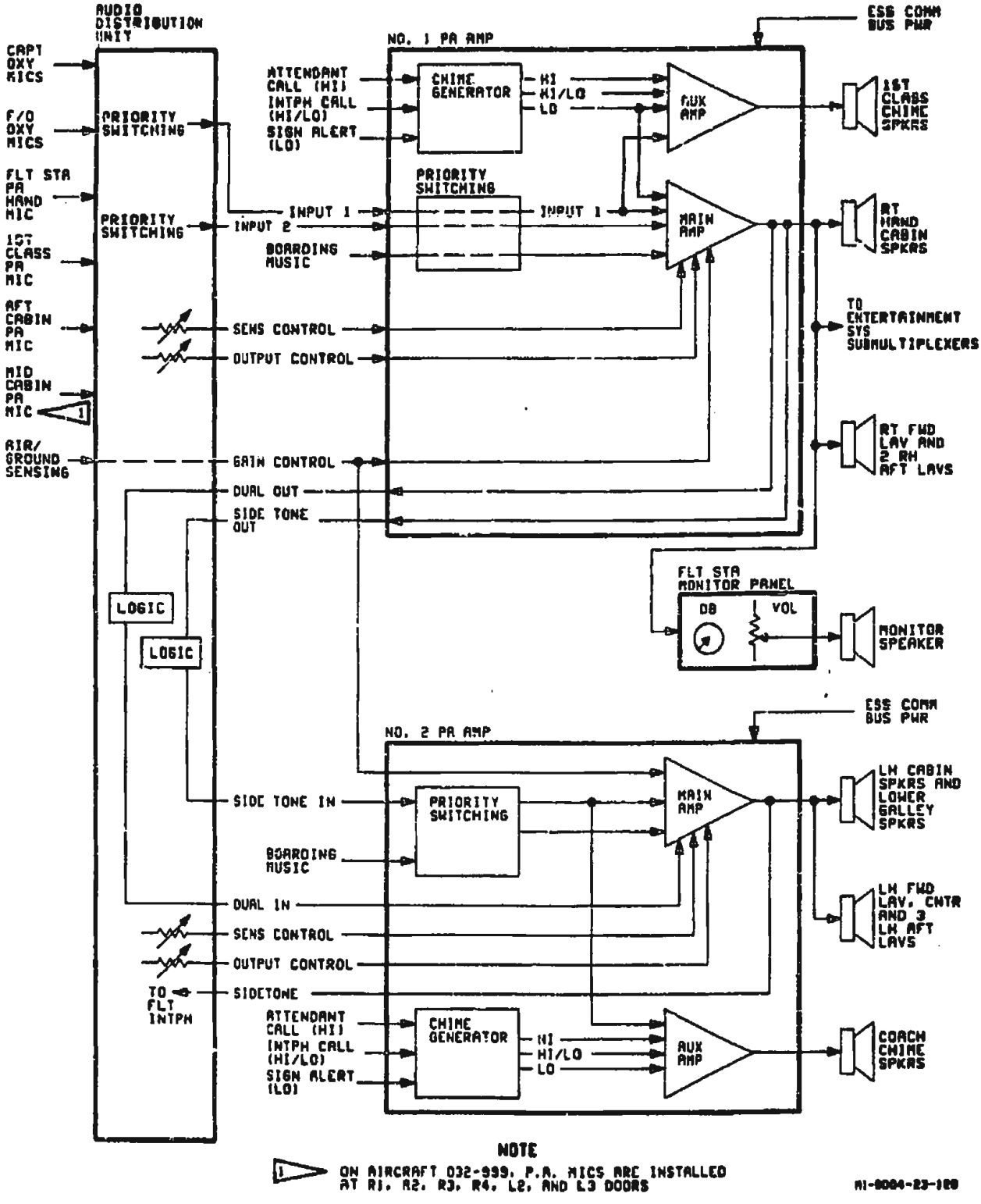
When the COACH AREA switchlight is depressed (FIRST CLASS switchlight released), a ground return is applied to the switchlight and ADU relay logic circuit. The COACH AREA light comes on and the relay logic circuit is enabled to
R interface the PA microphone to the No. 2 amplifier input No. 1.

R The PA microphone PTT switch enables the ADU relay logic circuit, which in turn keys the No. 2 amplifier input No. 1. The audio signals are amplified by the main and auxiliary amplifiers and used to drive the coach area speakers.

When the FIRST CLASS and COACH AREA switchlights are both depressed, the No. 1 amplifier drives first class speakers in the same manner as the FIRST CLASS only selection. The No. 1 amplifier sidetone circuit is applied (through the
R ADU) to the No. 2 amplifier input No. 1 in place of the PA microphone audio output during a COACH AREA only selection. The No. 2 amplifier amplifies the sidetone and applies it to the speaker circuit in the same manner as the COACH AREA only selection.

B. Captains Oxygen Mask Microphone Mode

When the PA ON OXY switchlight on the Captains headset stowage and microphone selector console assembly is depressed (Ref. 23-51-00), the Captains oxygen mask
R microphone is connected to the PA circuit. Operating the PTT switch on the Captains console assembly applies a ground return to the ADU relay logic circuit to give the oxygen



R Passenger Address System Block Diagram
R Figure 2

microphone the highest priority. All other audio inputs are inhibited in this mode. Audio signals are distributed
R through the PA circuits in the same manner as in the flight
R station PA hand microphone mode (COACH AREA and FIRST CLASS).

C. First Officers Oxygen Mask Microphone Mode

When the PA ON OXY switchlight on the First Officers headset stowage and microphone selector console assembly is depressed, the First Officers oxygen mask microphone is
R connected to the PA circuit. Operating the PTT switch on the First Officers console assembly applies a ground return
R to the ADU relay logic circuit. The operation of the PA
R system is the same as in the PA microphone mode (COACH AREA and FIRST AREA). The ADU relay logic circuit gives the Captains oxygen microphone circuit priority over the First Officers oxygen microphone circuit.

D. Mid Cabin Service Center Microphone Mode

The mid cabin service center position has the capability of announcing to the first class area, the coach area, or both. When the FIRST CLASS switchlight is depressed and latched, a ground return is applied to the switchlight lamp and to the ADU relay logic circuit. The switchlight comes on and the relay logic circuit is enabled to interface the mid cabin
R service center PA microphone to the No. 1 PA amplifier.
R Pressing the PA microphone PTT switch enables the ADU relay logic circuit, which in turn keys the No. 1 amplifier No. 2 input. If input No. 1 is not already keyed, audio from the mid cabin service center microphone is amplified by the main amplifier to drive the first class speakers.

When the COACH switchlight is depressed (FIRST CLASS switchlight released), a ground return is applied to the switchlight lamp and the ADU relay logic circuit. The COACH light comes on, and the relay logic circuit is enabled to
R interface the mid cabin service center PA microphone to the
R No. 2 amplifier. Operating the PA microphone PTT switch enables the ADU relay logic circuit, which in turn keys the No. 2 amplifier No. 2 input. The audio signals are amplified by the main amplifier and are used to drive the
R coach area PA speakers. When both FIRST CLASS and COACH switchlights are depressed, audio from the No. 1 amplifier is applied to the No. 2 amplifier through the dual-installation circuit. The audio signals are amplified by the No. 2 amplifier main amplifier and are used to drive
R the coach area PA speakers in the same manner as a coach only selection.

On aircraft 025-999, microphones at the R1, L2, R2, L3, R3 and R4 doors do not
R have selective capabilities.

When an announcement selection is made to the coach or
R first-class area while the PA system is already in use for
R that area the audio distribution unit relay logic connects
R the microphone with the highest priority to the PA amplifier. Flight station microphone announcements during an attendant microphone announcement take priority. This priority is established by the amplifier circuits.

E. Left Aft Cabin Attendant Microphone Mode

The left aft cabin attendant has the capability of announcing to the coach area only, or to both coach and first class simultaneously. Announcements cannot be made to the first class area only from this position. When the COACH ONLY switchlight is depressed the light comes on. Microphone announcements from the left aft cabin attendants microphone are routed to the coach area speakers in the same manner as that described for the mid cabin service center microphone (COACH) mode. When announcements are made without depressing and latching the COACH ONLY switchlight,
R audio is routed to both class area PA speakers in the same manner as that described for the mid cabin service center microphone (FIRST CLASS and COACH) mode. Left aft cabin attendant microphone announcements take second priority for attendant announcements. This priority is established by the ADU relay logic circuit.

F. Left Forward Cabin Attendant Microphone Mode

The left forward cabin attendant has the capability of announcing to the first class area only or to both first class and coach simultaneously. Announcements cannot be made to the coach area only from this position. When the FIRST ONLY switchlight is depressed and latched the light comes on. Microphone announcements from the left forward
R attendants microphone are routed to the first class area PA speakers in the same manner as that described for the mid cabin service center microphone (FIRST CLASS) mode. When announcements are made without depressing and latching the
R FIRST ONLY switchlight, audio is routed to both class area
R PA speakers in the same manner as that described for the mid cabin service center microphone (FIRST CLASS and COACH) mode. Left forward cabin attendant microphone announcements take first priority in attendant announcements. This priority is established by the ADU relay logic circuit.

G. Boarding Music Mode

When the boarding music control switch, located at the forward cabin attendants position (Ref. 23-35-00), is selected to ON, a ground return is applied to the No. 4 input key line of the No. 1 PA amplifier. If input No. 1 or No. 2 is not already keyed, input No. 4 keys to accept the boarding music audio. The audio is amplified by the No. 1 amplifier main amplifier and applied to the first-class area PA speakers and the dual-installation circuit to the No. 2 amplifier. The No. 2 amplifiers main amplifier output is applied to the coach area PA speakers. When a PA announcement has been keyed to both first class and coach areas, the boarding music is inhibited in each amplifier. When a first class announcement is made, the ADU logic circuit is enabled to transfer the boarding music audio from the No. 1 amplifier directly to the No. 2 amplifier input No. 4. This enables the coach area PA speakers to continue relaying boarding music audio from the No. 1 amplifier directly to the No. 2 amplifier input No. 4. This enables the coach area PA speakers to continue relaying boarding music while the first-class area receives a PA announcement. When a coach announcement is made, the boarding music is inhibited in the No. 2 amplifier to allow the priority (PA circuit) announcement to be relayed over coach speakers. The first-class area relays the boarding music over the speakers in the same manner as in the both-class operation.

H. High-chime Tone Mode

The high-chime tone circuits in the No. 1 and No. 2 PA amplifiers are triggered by a passenger service call through the passenger audio entertainment and service system (Ref. 23-33-00) or by depressing the CALL - SIGNAL switch on the flight station CABIN INTERPHONE control panel (Ref. 23-41-00). A 28V dc pulse is routed to the applicable PA amplifier to activate the chime circuit when the interrogator circuit has been pulsed by the operation of a passenger call button. If the pulse was generated by a first class passenger seat call button, the No. 1 PA amplifier is triggered. If the pulse was generated by a coach class passenger seat call button, the No. 2 PA amplifier is triggered. If a pulse is generated by depressing the CALL - SIGNAL switch, both amplifiers are triggered. When the No. 1 PA amplifier receives a 28V dc pulse, an oscillator circuit generates a high tone which is amplified by the auxiliary amplifier. The auxiliary amplifier output is applied to the first class chime speakers. Similarly, when the No. 2 PA amplifier receives a 28V dc pulse, it amplifies the triggered high tone and applies it to the coach chime speakers.

I. Low-chime Tone Mode

When either the NO SMOKING or FASTEN SEAT BELT switchlight (Ref. 33-29-00) is depressed and latched, a 28V dc supply is
R placed on the low-tone circuit in PA amplifiers No. 1 and No. 2. This 28V dc remains on the line until the switchlight is released. Connecting or disconnecting 28V dc to the low-tone circuit triggers the oscillators to produce
R a low tone. This low tone is amplified by both PA amplifier
R auxiliary amplifiers and main amplifiers. The auxiliary
R amplifiers drive the chime speakers with the low-tone
R signal, and the main amplifiers drive the PA speakers with
R the low-tone signal. When the NO SMOKING or FASTEN SEAT
R BELT switchlight is released, the 28V dc is disconnected
R from the PA amplifiers; the low-tone oscillator is triggered to generate a signal over the speaker system in the same manner as when the 28V dc supply was connected.

J. High/Low Chime Tone Mode

Whenever the cabin and galley interphone (Ref. 23-41-00) dialing system is operated, a 28V dc pulse is triggered in the flight station CABIN INTERPHONE control unit. If the interphone call is directed to a first class interphone
R station, the 28V dc pulse is applied to the No. 1 PA amplifier high/low attendant call input circuit. The high and low oscillators in the amplifier are triggered to produce first a high and then a low tone. The tone signal is amplified by the auxiliary amplifier and applied to the first class chime speakers.

If the interphone call is directed to a coach interphone
R station, the 28V dc pulse is applied to the No. 2 PA
R amplifier high/low attendant call input circuit. The high
R and low oscillators are triggered in the No. 2 PA amplifier
R in the same manner as for the No. 1 PA amplifier. The signal tone output from the auxiliary amplifier is applied to the coach chime speakers.

3. Passenger Address Amplifier

A. Description and Operation

Passenger Address Amplifiers No. 1 and No. 2 are identical units but are wired externally to drive different circuits
R within chime and PA speaker areas. Each amplifier is housed in an ATR case with electrical connection being made through a dual connector designated J1 (lower) and J2 (upper). The amplifier circuit is divided into two functions: the main amplifier and the auxiliary amplifier. The main amplifier
R amplifies audio from PA microphones to drive the PA speakers. The auxiliary amplifier amplifies chime tones generated within the amplifier to drive the chime speakers.

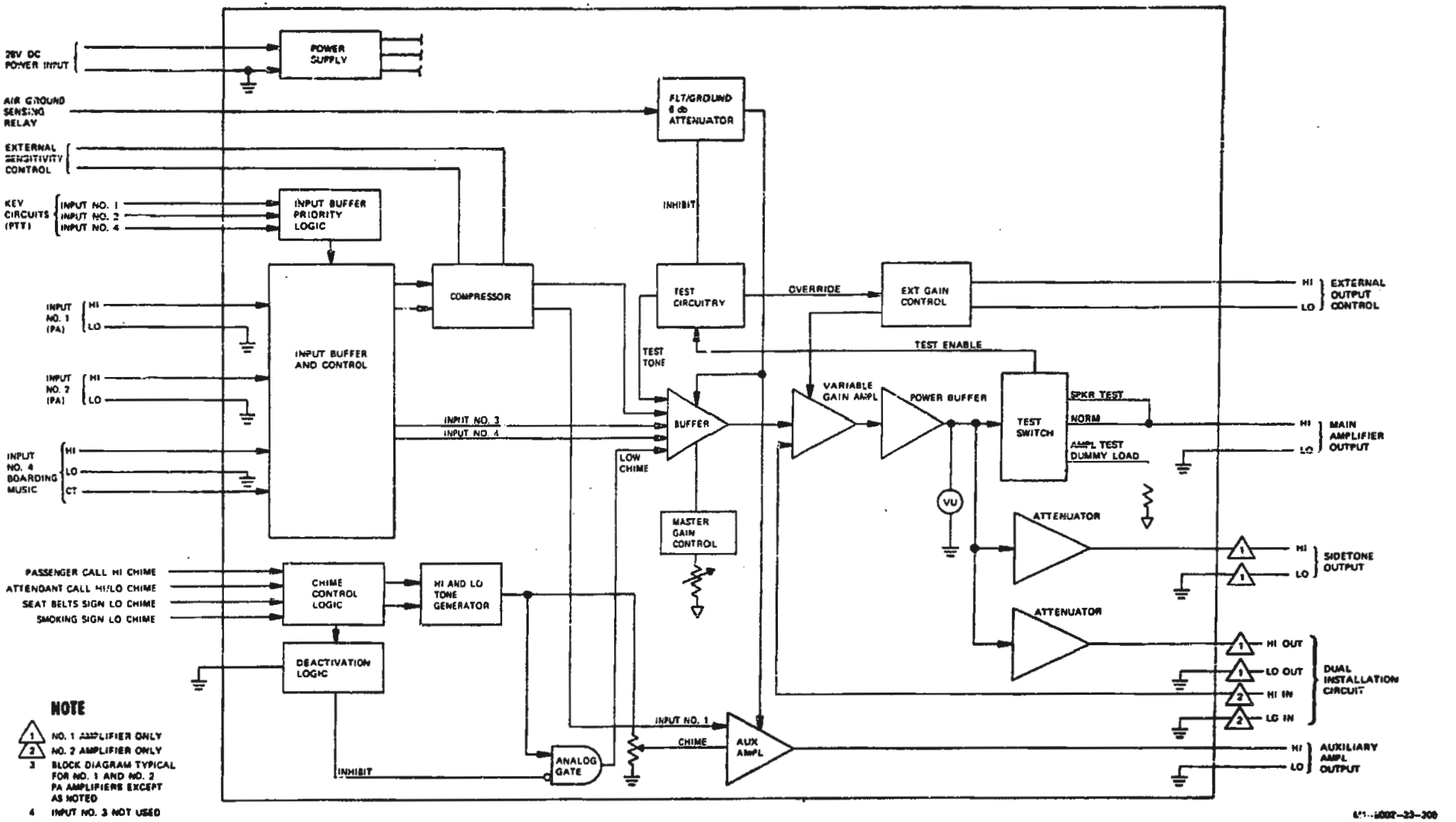
The auxiliary amplifier also interfaces with input No. 1 so
R that all PA announcements made from the flight station PA
R microphones are heard over chime speakers in addition to PA
R speakers. The chime circuit interfaces with the main
R amplifier so that the low-chime tone can be heard over the
R PA speakers in addition to the chime speakers.

If the main amplifier receives more than one keying command, the amplifier use is determined by the input buffer priority logic circuit (Ref. Fig. 3). Priority is determined in the numerical order shown. With a priority input enabled, the audio (passenger announcements or boarding music) is
R amplified by the main amplifier and applied to the PA speaker circuit. The sidetone output is used on the No. 1 amplifier only when a simultaneous first class and coach mode is selected by the flight station. During this mode the sidetone audio is applied to the coach speaker circuit.

The chime control logic is enabled by the operation of the passenger call system (Ref. 33-26-00), cabin and galley interphone system (Ref. 23-41-00), and the sign posting system (Ref. 33-29-00). The passenger call system and cabin and galley interphone system activate the high and high/low chime circuits in the No. 1 amplifier (first class area) and No. 2 amplifier (coach). The sign posting system (FASTEN SEAT BELTS and NO SMOKING SIGNS) activate the low-chime circuit in the No. 1 and No. 2 amplifiers. When the tone generator is triggered to generate high or high/low chime tones (by the presence of 28V dc), the auxiliary amplifier amplifies the audio to drive the chime speakers. When the tone generator is triggered to produce a low tone (by the presence and the absence of 28V dc), the low tone is applied to the auxiliary amplifier circuit, and the main amplifier circuit through the analog gate circuit. The deactivation logic inhibits the analog gate from passing the high and high/low chime tones to the main amplifier. The amplifier auxiliary amplifier amplifies the low-chime tones and applies them to the chime speaker circuits. The main amplifier also amplifies the low-chime tones and applies
R them to the PA speakers. If the main amplifier is in use, the low-chime tone is superimposed on the existing audio.

Each amplifier has an output control located in the audio distribution unit for external control of the main amplifier gain circuit. Both the main and auxiliary amplifier outputs are attenuated through the operation of the air/ground sensing relay, when the aircraft is on the ground to compensate for reduced ambient noise.

When the amplifier front panel test switches are selected to NORM, the amplifier is connected to its normal operating circuits with the VU meter recording the main amplifier



R Passenger Address Amplifier Functional Diagram
R Figure 3

EFFECTIVITY: ALL

0048

R output. When selected to CAL, the PA speakers are disconnected and a dummy load is connected across the main amplifier, a VU meter fixed power reading is recorded. In the SPKR TEST position the test circuit is enabled to supply a continuous audio signal through the main amplifier circuit to drive the PA speakers.

4. Speaker Transformer

A. Description

Fifty identical stepdown line transformers are provided to
R match the PA amplifier outputs to the 4-inch and 8-inch,
R 8-ohm loudspeakers in the PA system. Transformers are not provided for the chime speakers.

Each transformer is located above the ceiling panels next to its associated speaker. Primary and secondary connections are terminated through eight terminal (spade-type) connectors on the transformer case. Pins 1 (HI) and 2 (LO) connect the primary winding to the amplifier output circuit. Pins 3, 4, 5, 6, 7, and C (common) provide tap connections to the secondary windings. The 4-inch speaker installations use pins C and 4, and C and 7; and the 8-inch speaker
R installations use pins C and 6, and C and 3.

5. Eight-inch Speaker

A. Description

Forty 8-inch permanent magnet dynamic loudspeakers are located throughout the passenger compartment seat areas above the ceiling panels. The speaker has a barium-ferrite core, a nominal voice coil impedance of 8 ohms at 400 Hz, and a frequency range of 50 to 12,000 Hz. Electrical connection is provided by a twin, spade-type connector attached to the speaker. The common tab terminal is identified by a red dot painted on the cone housing next to that terminal.

6. Four-inch Speaker

A. Description

Twenty-two 4-inch permanent magnet dynamic loudspeakers are located throughout the flight station and cabin and galley areas. The speaker has an ALNICO V-core, a nominal voice coil impedance of 8 ohms at 400 Hz, and a frequency range of 100 to 10,000 Hz. Speaker coil connection is provided by a

twin, spade-type connector attached to the unit. The common tab terminal is identified by a painted red dot on the cone housing next to that terminal.

PASSENGER ADDRESS (PA) SYSTEM - FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, R the code number can be found in the Fault Isolation Reference R Table in the Chapter 23 Fault Code Index. The index specifies R the exact maintenance manual section, fault isolation diagram, R and block number on the diagram where the fault isolation R procedure should start. Schematics are included at the end of R the section to supplement the fault isolation diagrams or as an R aid in isolating a problem not covered on the diagrams. Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Figures 101 and 102 are Component Index Locator(s) and Diagram(s), fault isolation block diagrams start with Figure 103, and may be supplemented with system schematics located at the rear of this section.

Table 101 lists the fault isolation diagrams and schematics in this section.

Passenger Address System Fault Isolation Diagrams
Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Call Signal Ordinance Chimes Inoperative
104	PA Output Defective
105	Flight/Ground PA Output Change Problem

Passenger Address System Fault Isolation Diagrams (Cont)
Table 101

FIGURE	TITLE
106	PA Too Loud
107	PA Operation Faulty From Hand Mic
108	PA Does Not Override Boarding Music
109	Area Selection Problem
110	VU Meter and PA In Use Light Faulty
111	PA Selected - No Headset Sidetone
SCHEM 1	Passenger Address System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
AMPLIFIER – PASSENGER ADDRESS (PA)	2	FESC/112AB	23-31-01
CIRCUIT BREAKERS:			
PA AMPL NO. 1 – 2331-CB1	1	A-15/CB1 PNL	•
PA AMPL NO. 2 – 2331-CB2	1	A-16/CB1 PNL	•
DISTRIBUTION UNIT – AUDIO	1	FESC/112AB	23-51-03
MICROPHONE – PA:			
FLT STA	1	FLT STA/CTR CSL	23-31-02
CABIN ATTENDANT	3	FWD, MID, AFT ATTEND PNL	23-31-02
PANEL – PA CONTROL	1	FLT STA/PILOT OVHD PNL	23-31-12
SPEAKER:			
EIGHT-INCH	40	CAB CEILING PANELS	23-31-04
FOUR-INCH	22	CAB CEILING PANELS	23-31-06
TRANSFORMER	50	CAB CEILING PANELS	23-31-03
SWITCH – 1ST CLASS/COACH TRANSFER			
CHIME SELECT – 2331-S1	1	FS 597/233BB	•
CHIME SELECT – 2331-S6	1	FS 864/243GB	•
SPEAKER SELECT – 2331-S2	1	FS 609/233DB	•
SPEAKER SELECT – 2331-S3	1	FS 690/243EB	•
SPEAKER SELECT – 2331-S4	1	FS 768/243EB	•
SPEAKER SELECT – 2331-S5	1	FS 814/243FB	•
SPEAKER SELECT – 2331-S7	1	FS 950/252CB	•
SPEAKER SELECT – 2331-S8	1	FS 1053/251JB	•
SPEAKER SELECT – 2331-S9	1	FS 1103/251DB	•
SPEAKER SELECT – 2331-S10	1	FS 1155/251DB	•

*SEE WM EQUIPMENT LIST

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R Component Location Index
R Figure 101

R EFFECTIVITY: ALL
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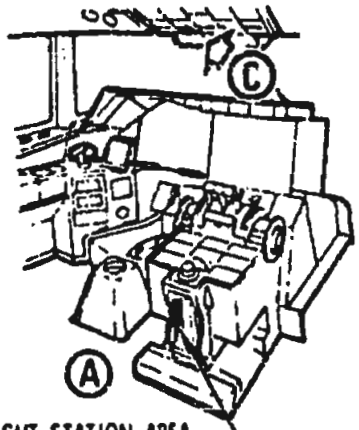
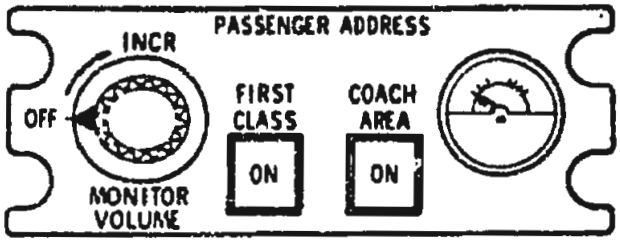


FLIGHT STATION AREA
VIEW LOOKING FORWARD

PA MICROPHONE



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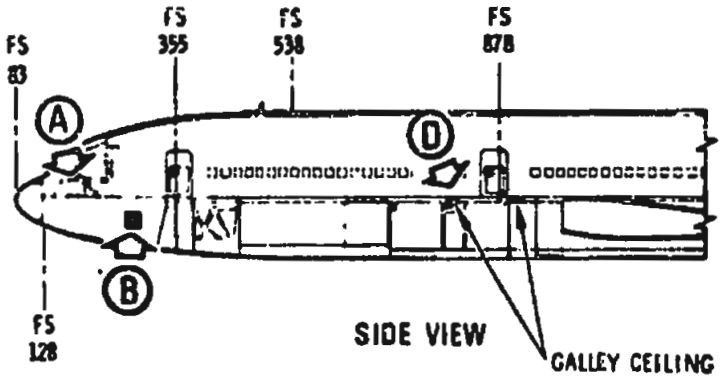
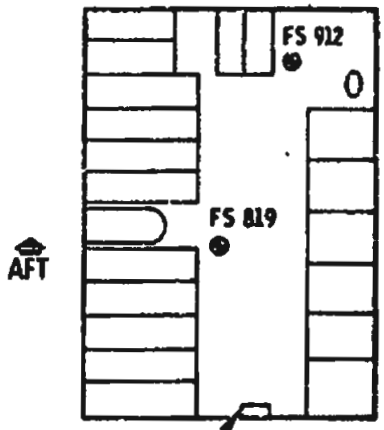
PASSENGER ADDRESS CONTROL PANEL



SIDE VIEW

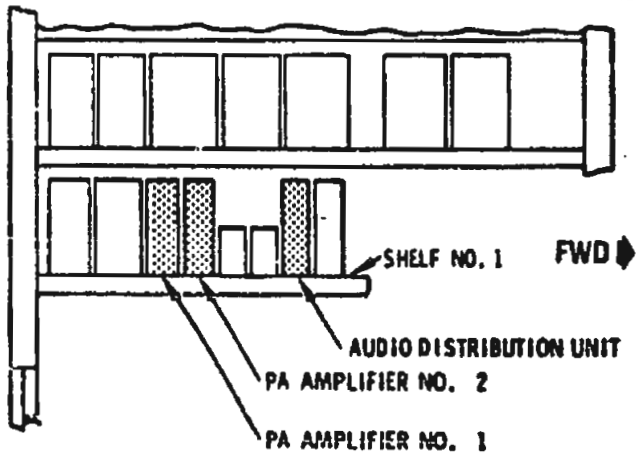
GALLEY CEILING
4-INCH PA SPEAKERS



8-INCH SPEAKER
ENCLOSURE FS 706

Ⓓ

GALLEY
(PLAN VIEW)



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FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING OUTBOARD

M1-0000-23-3489

R
R Component Locator Diagram
Figure 102 (Sheet 1)

R EFFECTIVITY: ALL
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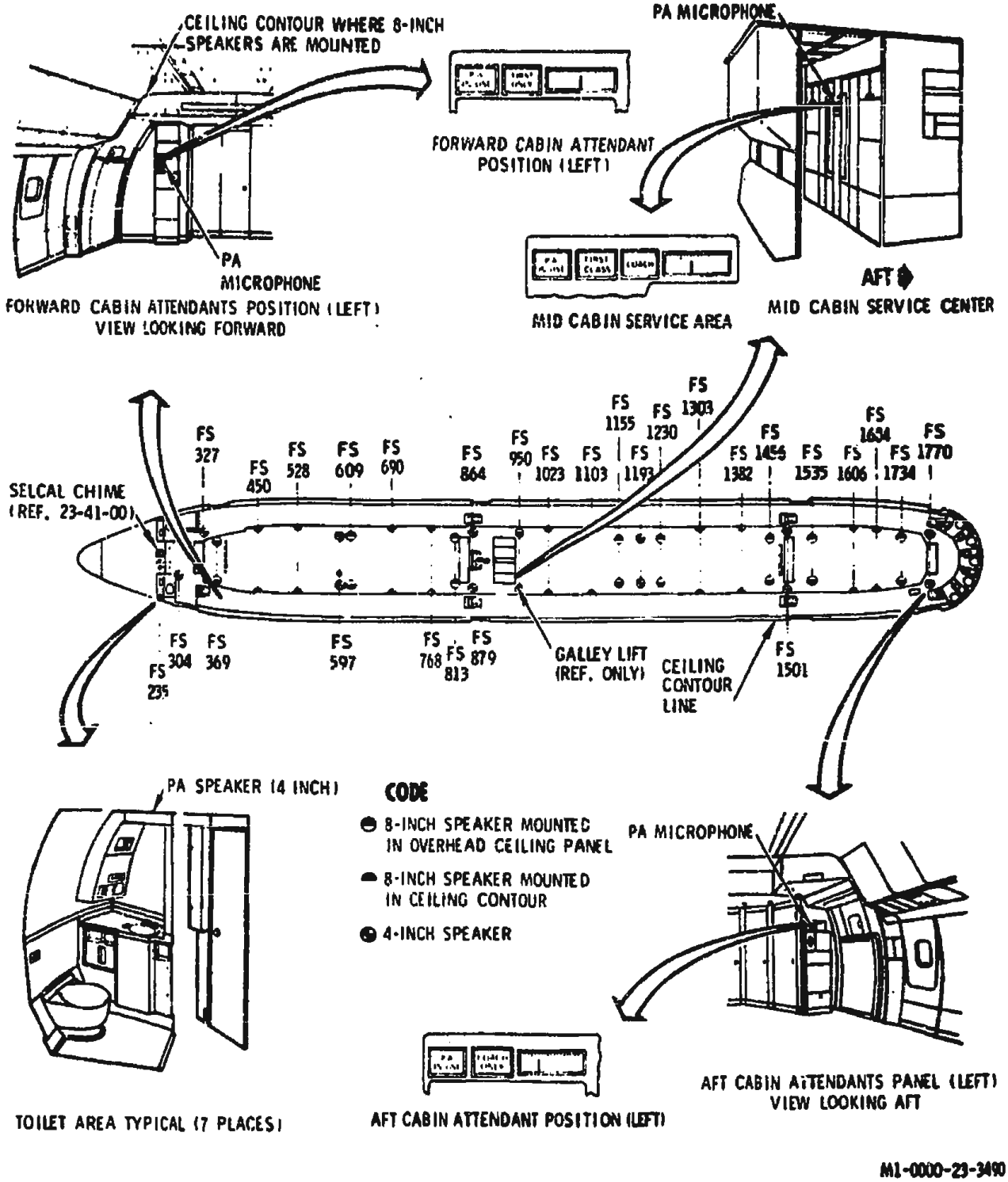

M1-0000-23-3490

R
R Component Locator Diagram
Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
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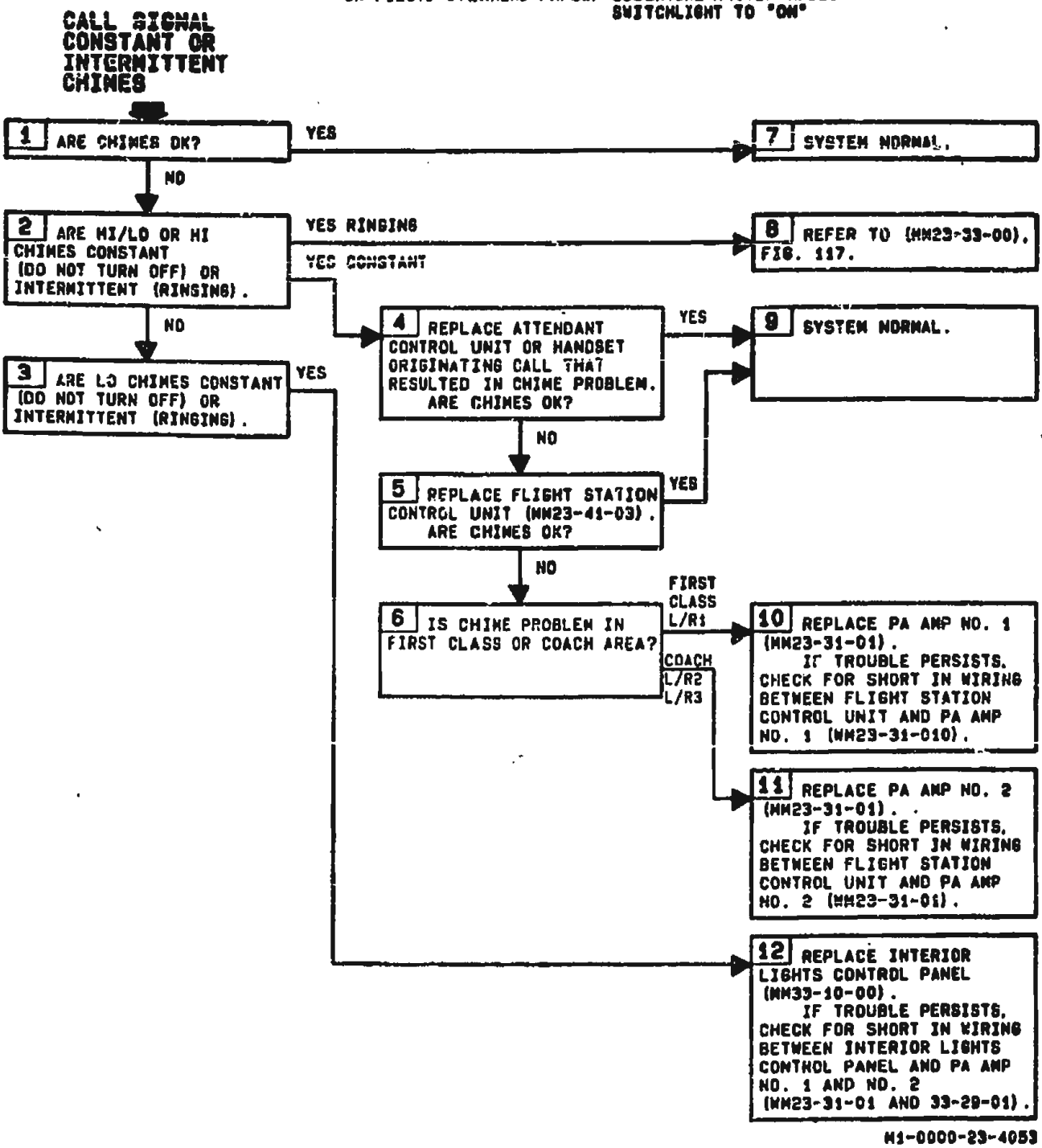
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A15, 1A16, 2C11
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON"

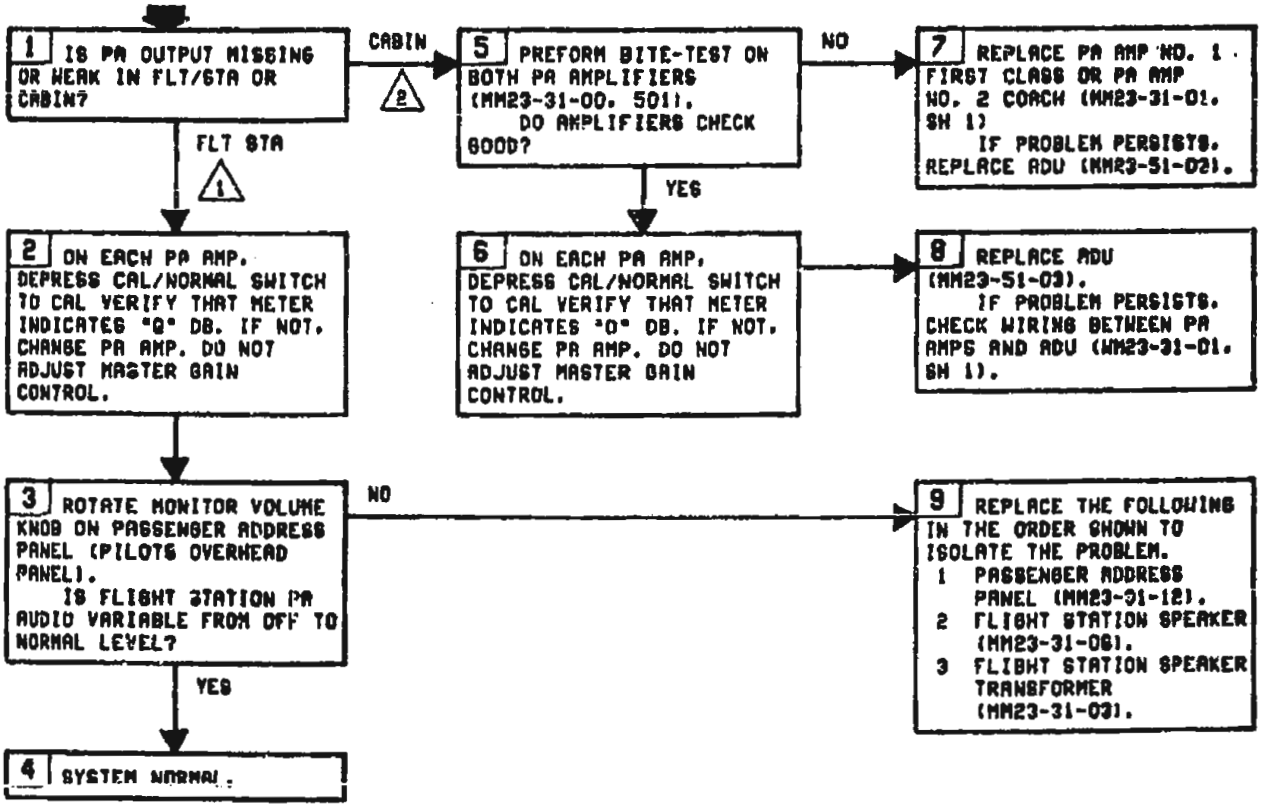

CALL SIGNAL CONSTANT OR INTERMITTENT CHIMES
1 ARE CHIMES OK?
YES
7 SYSTEM NORMAL.
NO
2 ARE HI/LO OR HI CHIMES CONSTANT (DO NOT TURN OFF) OR INTERMITTENT (RINGING).
YES RINGING
8 REFER TO (MM23-33-00), FIG. 117.
YES CONSTANT
NO
4 REPLACE ATTENDANT CONTROL UNIT OR HANDSET ORIGINATING CALL THAT RESULTED IN CHIME PROBLEM. ARE CHIMES OK?
YES
9 SYSTEM NORMAL.
3 ARE LO CHIMES CONSTANT (DO NOT TURN OFF) OR INTERMITTENT (RINGING).
YES
NO
5 REPLACE FLIGHT STATION CONTROL UNIT (MM23-41-03). ARE CHIMES OK?
YES
NO
6 IS CHIME PROBLEM IN FIRST CLASS OR COACH AREA?
FIRST CLASS L/R1
COACH L/R2 L/R3
10 REPLACE PA AMP NO. 1 (MM23-31-01). IF TROUBLE PERSISTS, CHECK FOR SHORT IN WIRING BETWEEN FLIGHT STATION CONTROL UNIT AND PA AMP NO. 1 (MM23-31-010).
11 REPLACE PA AMP NO. 2 (MM23-31-01). IF TROUBLE PERSISTS, CHECK FOR SHORT IN WIRING BETWEEN FLIGHT STATION CONTROL UNIT AND PA AMP NO. 2 (MM23-31-01).
12 REPLACE INTERIOR LIGHTS CONTROL PANEL (MM33-10-00). IF TROUBLE PERSISTS, CHECK FOR SHORT IN WIRING BETWEEN INTERIOR LIGHTS CONTROL PANEL AND PA AMP NO. 1 AND NO. 2 (MM23-31-01 AND 33-29-01).

M1-0000-23-4053

R R Call Signal, Constant or Intermittent Chimes
Figure 103

PREREQUISITES
ELECTRICAL POWER (MM24-00-00).
CB'S 1B15, 1A16
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON".

PA OUTPUT DEFECTIVE


1 IS PA OUTPUT MISSING OR WEAK IN FLT/STA OR CABIN?
CABIN
2
FLT STA
1
5 PREFORM BITE-TEST ON BOTH PA AMPLIFIERS (MM23-31-00, 501). DO AMPLIFIERS CHECK GOOD?
NO
7 REPLACE PA AMP NO. 1 - FIRST CLASS OR PA AMP NO. 2 COACH (MM23-31-01, SH 1) IF PROBLEM PERSISTS, REPLACE ADU (MM23-51-02).
YES
2 ON EACH PA AMP, DEPRESS CAL/NORMAL SWITCH TO CAL VERIFY THAT METER INDICATES "0" DB. IF NOT, CHANGE PA AMP. DO NOT ADJUST MASTER GAIN CONTROL.
6 ON EACH PA AMP, DEPRESS CAL/NORMAL SWITCH TO CAL VERIFY THAT METER INDICATES "0" DB. IF NOT, CHANGE PA AMP. DO NOT ADJUST MASTER GAIN CONTROL.
8 REPLACE ADU (MM23-51-03). IF PROBLEM PERSISTS, CHECK WIRING BETWEEN PA AMPS AND ADU (MM23-31-01, SH 1).
3 ROTATE MONITOR VOLUME KNOB ON PASSENGER ADDRESS PANEL (PILOTS OVERHEAD PANEL). IS FLIGHT STATION PA AUDIO VARIABLE FROM OFF TO NORMAL LEVEL?
NO
9 REPLACE THE FOLLOWING IN THE ORDER SHOWN TO ISOLATE THE PROBLEM.
1 PASSENGER ADDRESS PANEL (MM23-31-12).
2 FLIGHT STATION SPEAKER (MM23-31-06).
3 FLIGHT STATION SPEAKER TRANSFORMER (MM23-31-03).
YES
4 SYSTEM NORMAL.

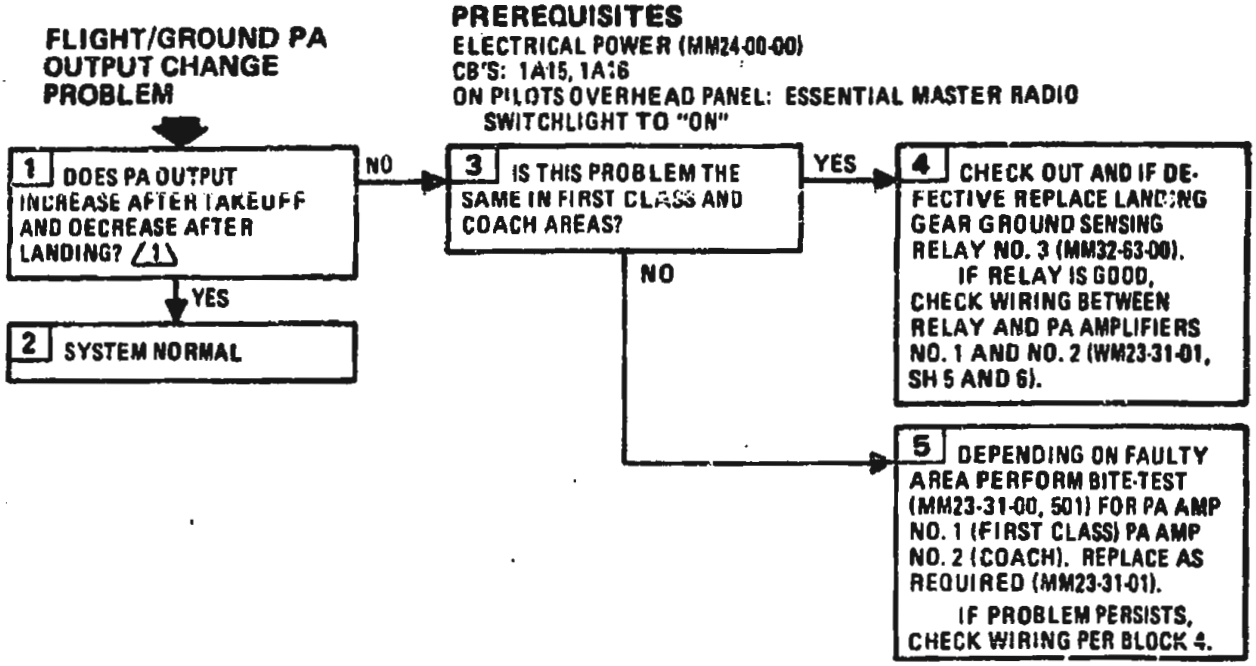
NOTE

1. MONITOR VOLUME KNOB ON PASSENGER ADDRESS CONTROL PANEL (PILOTS OVERHEAD PANEL) CONTROLS ONLY THE VOLUME TO THE FLIGHT STATION SPEAKER. CHECK POSITION OF KNOB BEFORE PERFORMING FAULT ISOLATION.

2. IF PA OUTPUT IS MISSING IN A SPECIFIC ZONE, VERIFY THAT THE OVERHEAD CLASS DIVIDER CHANGEOVER SWITCHES ARE SET TO THE CORRECT POSITION. IN ADDITION, CHECK THAT THE AREA SELECT SWITCHS ON THE CONTROL PANEL ARE SELECTED TO THE CORRECT POSITION.

M1-0000-23-1984

PA Output Defective
Figure 104

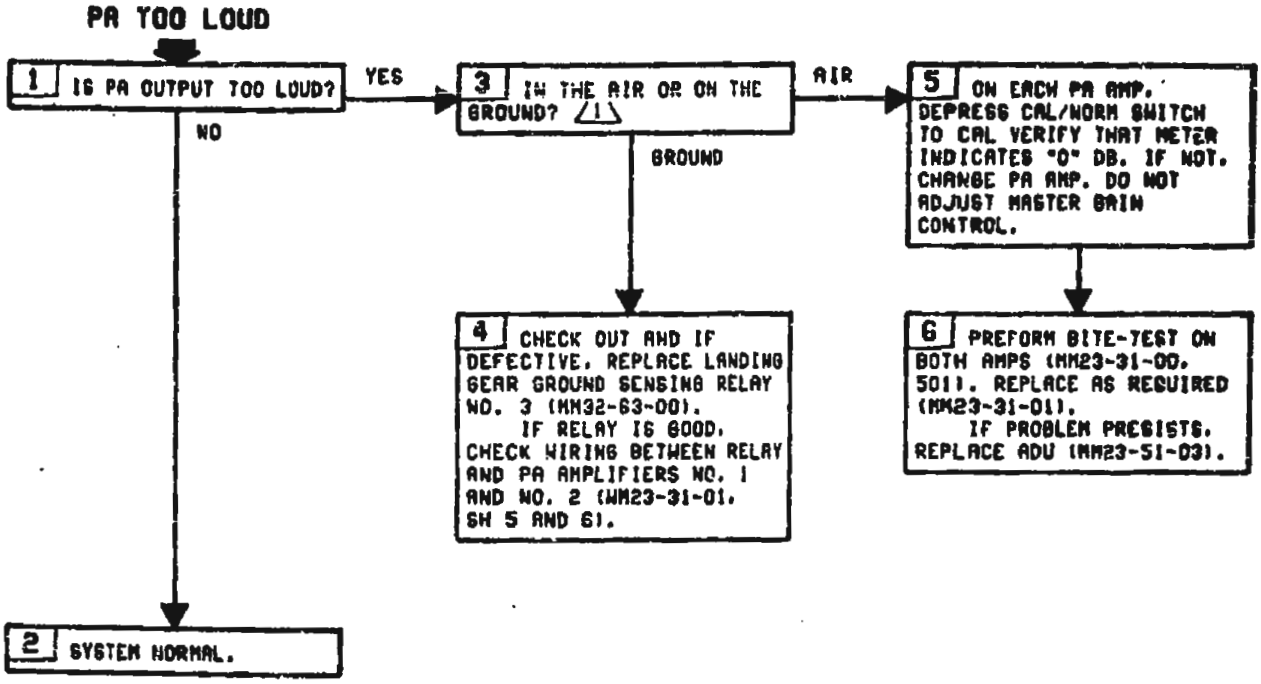

FLIGHT/GROUND PA OUTPUT CHANGE PROBLEM
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 1A15, 1A16
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON"
1 DOES PA OUTPUT INCREASE AFTER TAKEOFF AND DECREASE AFTER LANDING? /1\
NO
YES
2 SYSTEM NORMAL
3 IS THIS PROBLEM THE SAME IN FIRST CLASS AND COACH AREAS?
YES
NO
4 CHECK OUT AND IF DEFECTIVE REPLACE LANDING GEAR GROUND SENSING RELAY NO. 3 (MM32-63-00).
IF RELAY IS GOOD, CHECK WIRING BETWEEN RELAY AND PA AMPLIFIERS NO. 1 AND NO. 2 (WM23-31-01, SH 5 AND 6).
5 DEPENDING ON FAULTY AREA PERFORM BITE-TEST (MM23-31-00, 501) FOR PA AMP NO. 1 (FIRST CLASS) PA AMP NO. 2 (COACH). REPLACE AS REQUIRED (MM23-31-01).
IF PROBLEM PERSISTS, CHECK WIRING PER BLOCK 4.

/1\ NOTE
AIRBORNE CONDITION IS SIMULATED BY PULLING CB18 ON THE FE/SO OVERHEAD CIRCUIT BREAKER PANEL, CB2.

M1-0001-23-2086

R Flight/Ground PA Output Change Problem
R Figure 105

PREREQUISITES
ELECTRICAL POWER (AM24-00-00).
CB'S 1A1S, 1A15
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON".


PA TOO LOUD
1 IS PA OUTPUT TOO LOUD?
YES
NO
3 IN THE AIR OR ON THE GROUND? /1\
AIR
GROUND
5 ON EACH PA AMP, DEPRESS CAL/NORM SWITCH TO CAL VERIFY THAT METER INDICATES "0" DB. IF NOT, CHANGE PA AMP. DO NOT ADJUST MASTER GAIN CONTROL.
4 CHECK OUT AND IF DEFECTIVE, REPLACE LANDING GEAR GROUND SENSING RELAY NO. 3 (MM32-63-00). IF RELAY IS GOOD, CHECK WIRING BETWEEN RELAY AND PA AMPLIFIERS NO. 1 AND NO. 2 (MM23-31-01, SH 5 AND 6).
6 PREFORM BITE-TEST ON BOTH AMPS (MM23-31-00, 501). REPLACE AS REQUIRED (MM23-31-01). IF PROBLEM PERSISTS, REPLACE ADU (MM23-51-03).
2 SYSTEM NORMAL.

NOTE

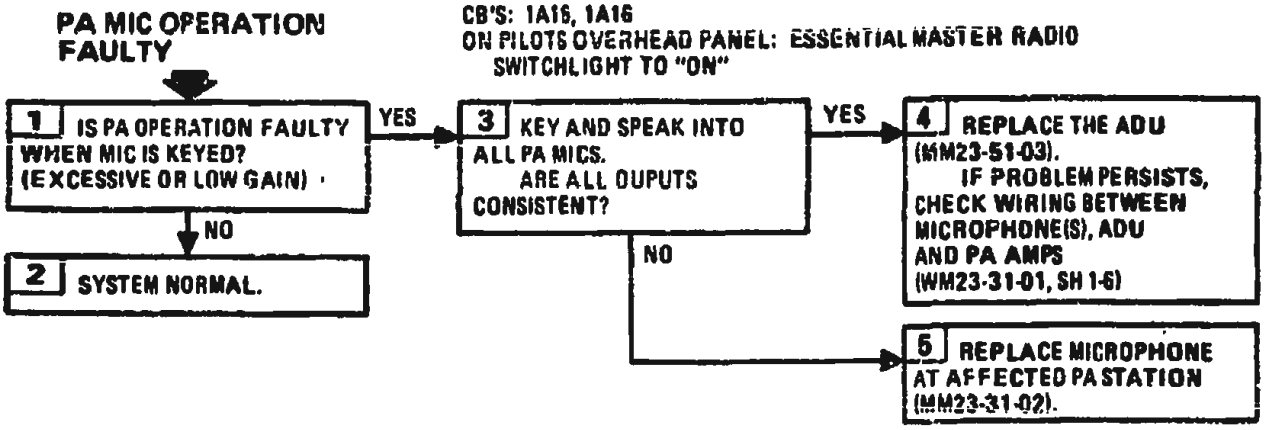
/1\ AIRBOURNE CONDITION IS SIMULATED BY PULLING CBLS ON THE FE/SO OVERHEAD CIRCUIT BREAKER PANEL, CB2.

RI-C000-23-1585

R
R

PA Too Loud
Figure 106

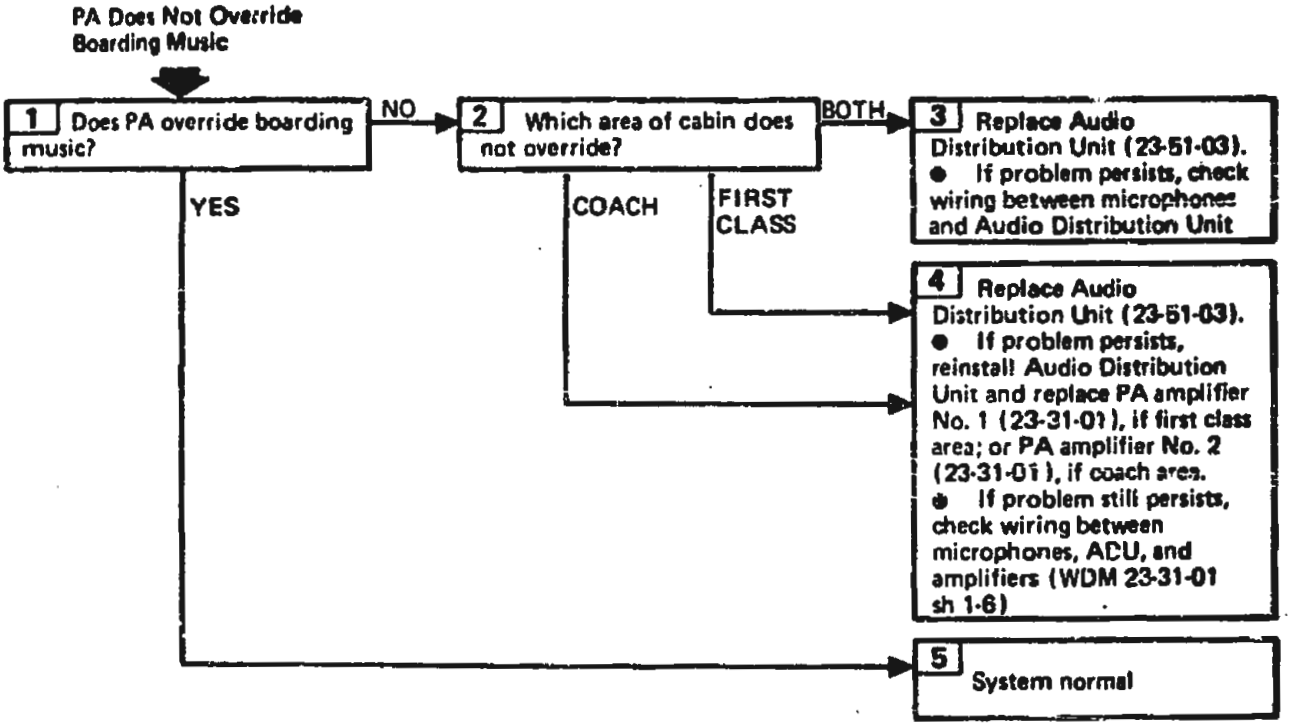
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 1A16, 1A16
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO SWITCHLIGHT TO "ON"


PA MIC OPERATION FAULTY
1 IS PA OPERATION FAULTY WHEN MIC IS KEYED? (EXCESSIVE OR LOW GAIN)
YES
NO
2 SYSTEM NORMAL.
3 KEY AND SPEAK INTO ALL PA MICS. ARE ALL OUPUTS CONSISTENT?
YES
NO
4 REPLACE THE ADU (MM23-51-03). IF PROBLEM PERSISTS, CHECK WIRING BETWEEN MICROPHONE(S), ADU AND PA AMPS (WM23-31-01, SH 1-6)
5 REPLACE MICROPHONE AT AFFECTED PA STATION (MM23-31-02).

M1-0006-23-2000

R PA Operation Faulty From Hand Mic
R (Squealing and/or No Audio Out)
R Figure 107

R EFFECTIVITY: ALL
R
001B


PA Does Not Override Boarding Music
1 Does PA override boarding music?
NO
2 Which area of cabin does not override?
BOTH
3 Replace Audio Distribution Unit (23-51-03).
● If problem persists, check wiring between microphones and Audio Distribution Unit
YES
COACH
FIRST CLASS
4 Replace Audio Distribution Unit (23-51-03).
● If problem persists, reinstall Audio Distribution Unit and replace PA amplifier No. 1 (23-31-01), if first class area; or PA amplifier No. 2 (23-31-01), if coach area.
● If problem still persists, check wiring between microphones, ACU, and amplifiers (WDM 23-31-01 sh 1-6)
5 System normal

PREREQUISITES
Elec Power (24-00-00)
CB's in: 1A15, 1A16
On pilots overhead panel: ESSENTIAL MASTER RADIO switchlight to "ON"

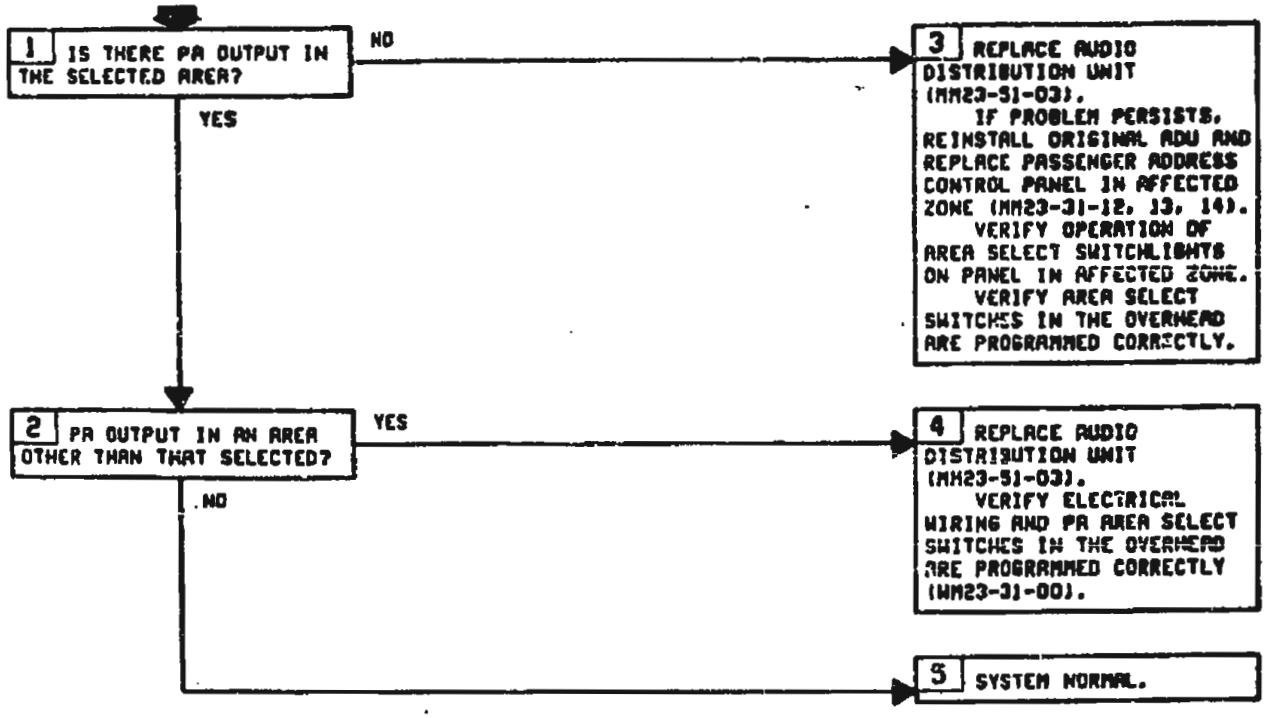
M1-5000-23-2080

R PA Does Not Override Boarding Music
R Figure 108

R EFFECTIVITY: ALL
R
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A15, 1A16
ON PILOTS OVERHEAD PANEL: ESSENTIAL
MASTER RADIO SWITCHLIGHT TO "ON"

AREA SELECTION PROBLEM

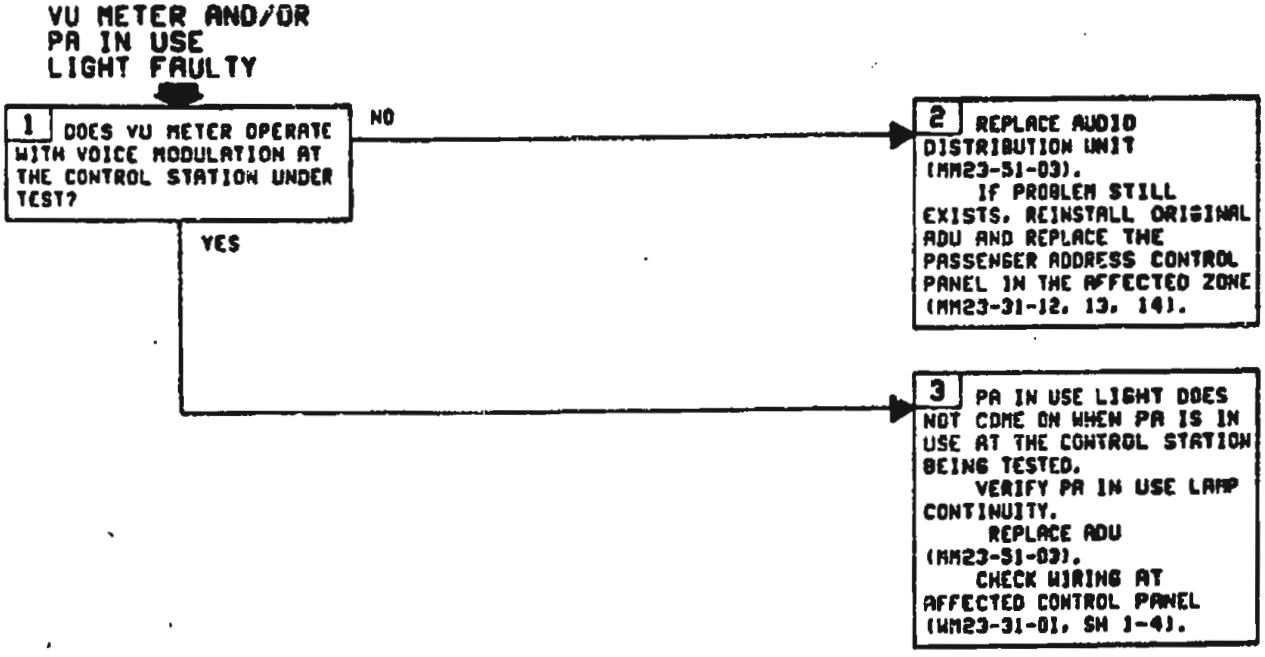

1 IS THERE PA OUTPUT IN THE SELECTED AREA?
NO
YES
3 REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
IF PROBLEM PERSISTS, REINSTALL ORIGINAL ADU AND REPLACE PASSENGER ADDRESS CONTROL PANEL IN AFFECTED ZONE (MM23-31-12, 13, 14).
VERIFY OPERATION OF AREA SELECT SWITCHLIGHTS ON PANEL IN AFFECTED ZONE.
VERIFY AREA SELECT SWITCHES IN THE OVERHEAD ARE PROGRAMMED CORRECTLY.
2 PA OUTPUT IN AN AREA OTHER THAN THAT SELECTED?
YES
NO
4 REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
VERIFY ELECTRICAL WIRING AND PA AREA SELECT SWITCHES IN THE OVERHEAD ARE PROGRAMMED CORRECTLY (MM23-31-00).
5 SYSTEM NORMAL.

NOTE
IF PROBLEM IS NOT SOLVED BY ABOVE, CHECK WIRING FROM CONTROL PANELS TO AUDIO DISTRIBUTION UNIT (MM23-31-01, SH 1-4).

R
R

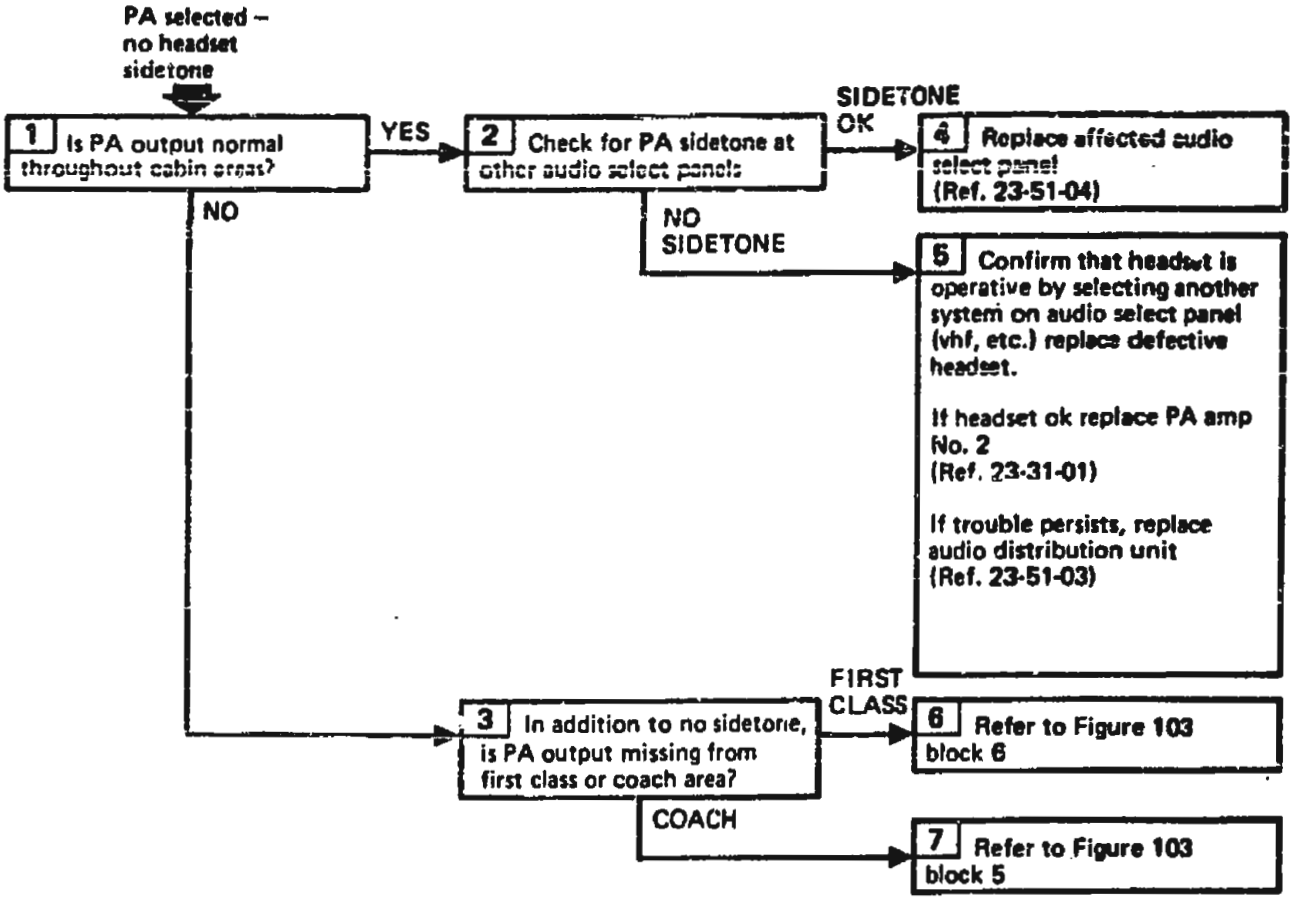
Area Selection Problem
Figure 109

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A15, 1A16
ON PILOTS OVERHEAD PANEL: ESSENTIAL MASTER RADIO
SWITCHLIGHT TO "ON"


VU METER AND/OR
PA IN USE
LIGHT FAULTY
1 DOES VU METER OPERATE WITH VOICE MODULATION AT THE CONTROL STATION UNDER TEST?
NO
YES
2 REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
IF PROBLEM STILL EXISTS, REINSTALL ORIGINAL ADU AND REPLACE THE PASSENGER ADDRESS CONTROL PANEL IN THE AFFECTED ZONE (MM23-31-12, 13, 14).
3 PA IN USE LIGHT DOES NOT COME ON WHEN PA IS IN USE AT THE CONTROL STATION BEING TESTED.
VERIFY PA IN USE LAMP CONTINUITY.
REPLACE ADU (MM23-51-03).
CHECK WIRING AT AFFECTED CONTROL PANEL (MM23-31-01, SH 1-4).

R1-0002-23-2004

R VU meter and PA in Use Light Faulty
R Figure 110


PA selected – no headset sidetone
1 Is PA output normal throughout cabin areas?
YES
2 Check for PA sidetone at other audio select panels
SIDETONE OK
4 Replace affected audio select panel (Ref. 23-51-04)
NO
NO SIDETONE
5 Confirm that headset is operative by selecting another system on audio select panel (vhf, etc.) replace defective headset.
If headset ok replace PA amp No. 2 (Ref. 23-31-01)
If trouble persists, replace audio distribution unit (Ref. 23-51-03)
3 In addition to no sidetone, is PA output missing from first class or coach area?
FIRST CLASS
6 Refer to Figure 103 block 6
COACH
7 Refer to Figure 103 block 5

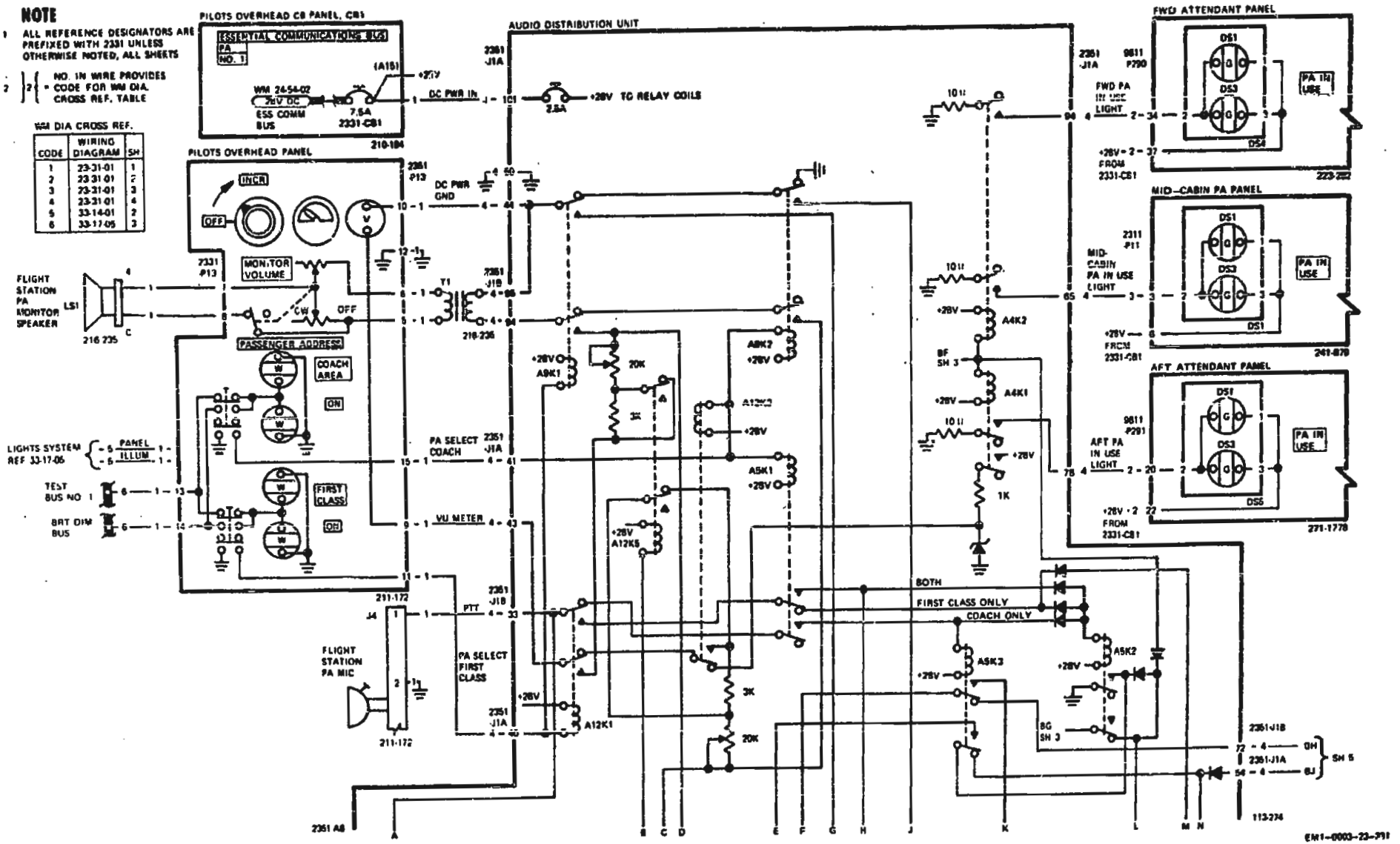
PREREQUISITES
Elec Pwr (24-00-00)
CB's in: 1A15, 1A16
On pilots overhead panel: ESSENTIAL MASTER RADIO switchlight to "ON"

M1-59400-23-2154

R R PA Selected - No Headset Sidetone
Figure 111

R R EFFECTIVITY: ALL

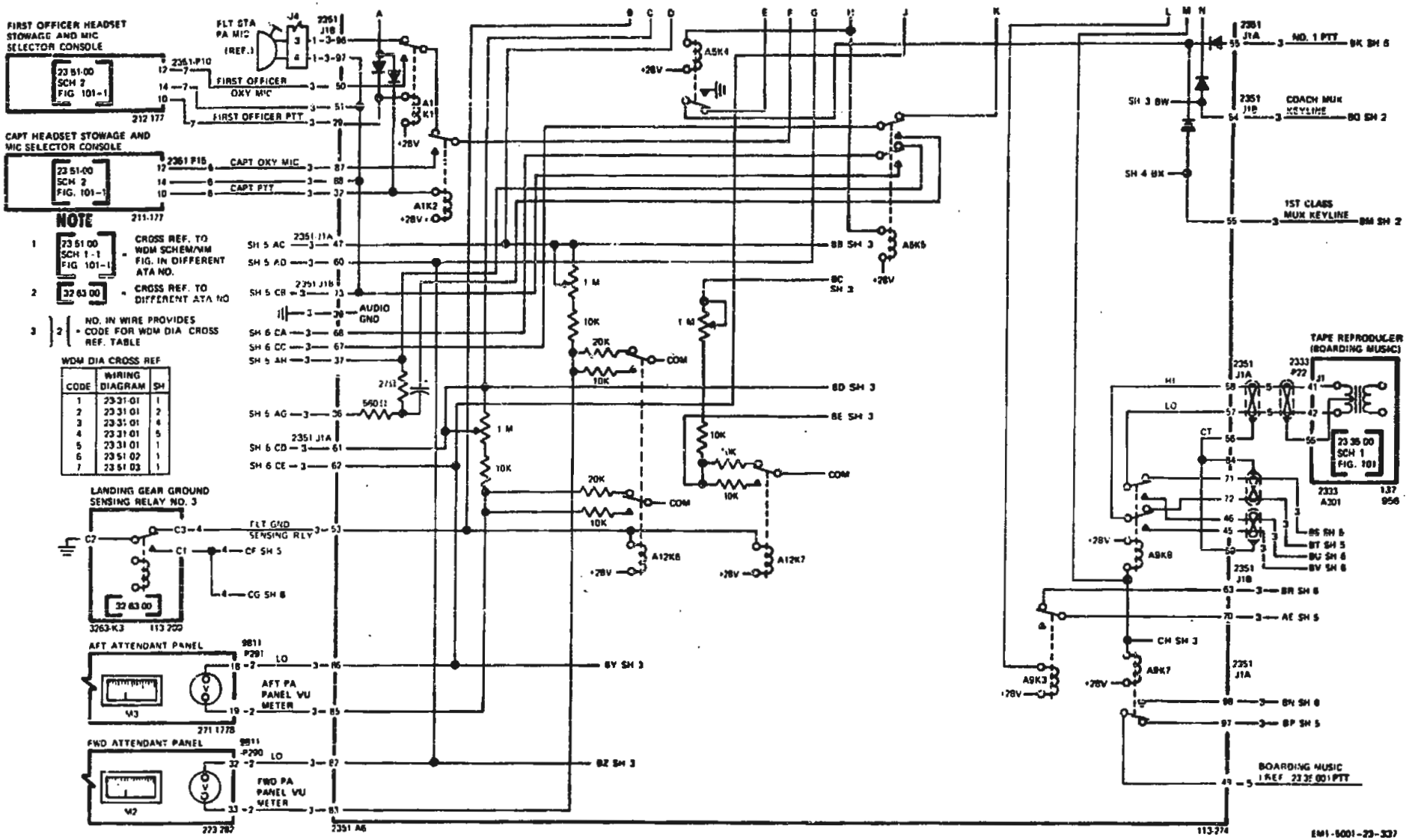
0018



Passenger Address System Schematic
SCHEM 1 (Sheet 1)

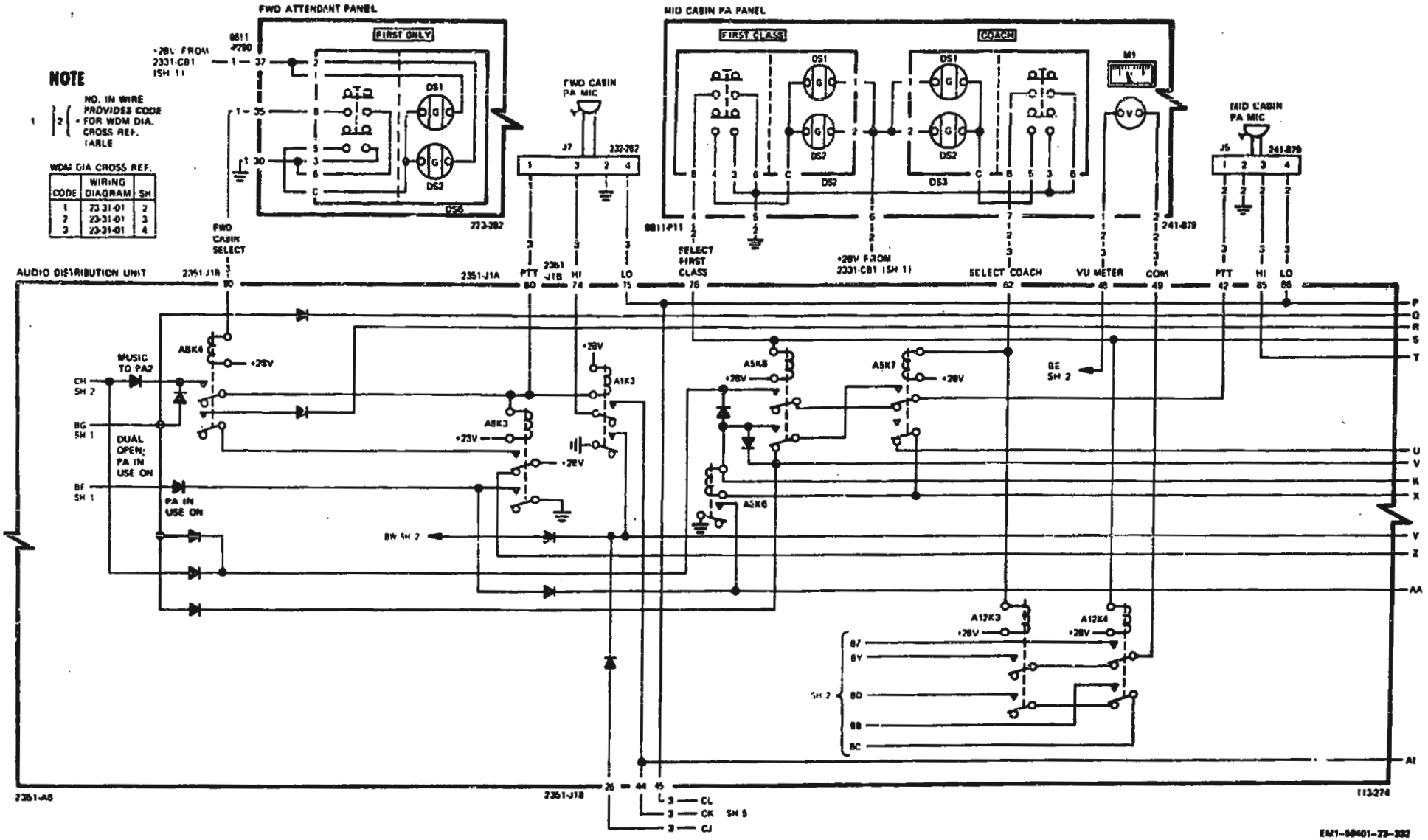
EFFECTIVITY: 001-031

0018



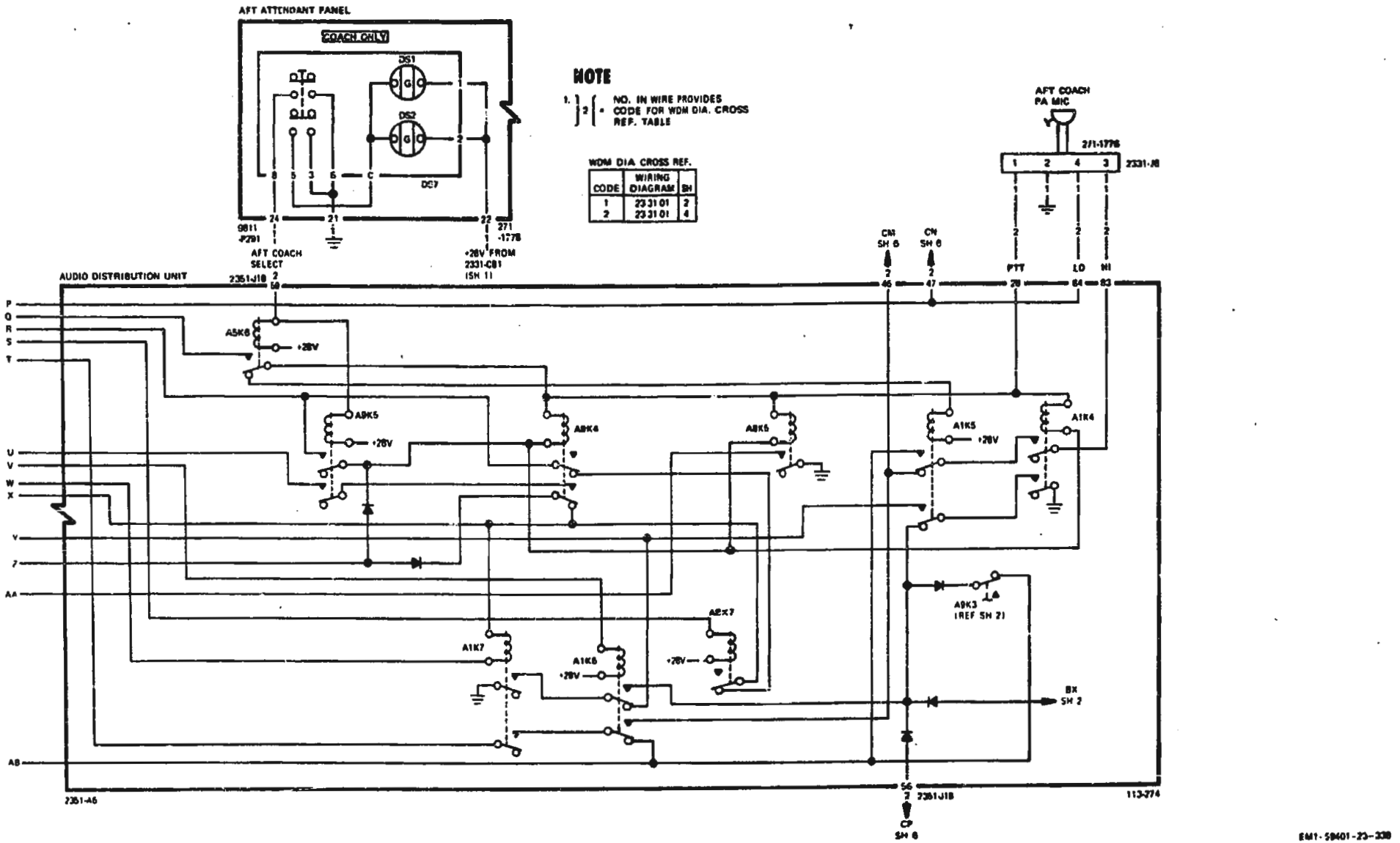
Passenger Address System Schematic
SCHEM 1 (Sheet 2)

R R 0018 EFFECTIVITY: 001-031



Passenger Address System Schematic
SCHEM 1 (Sheet 3)

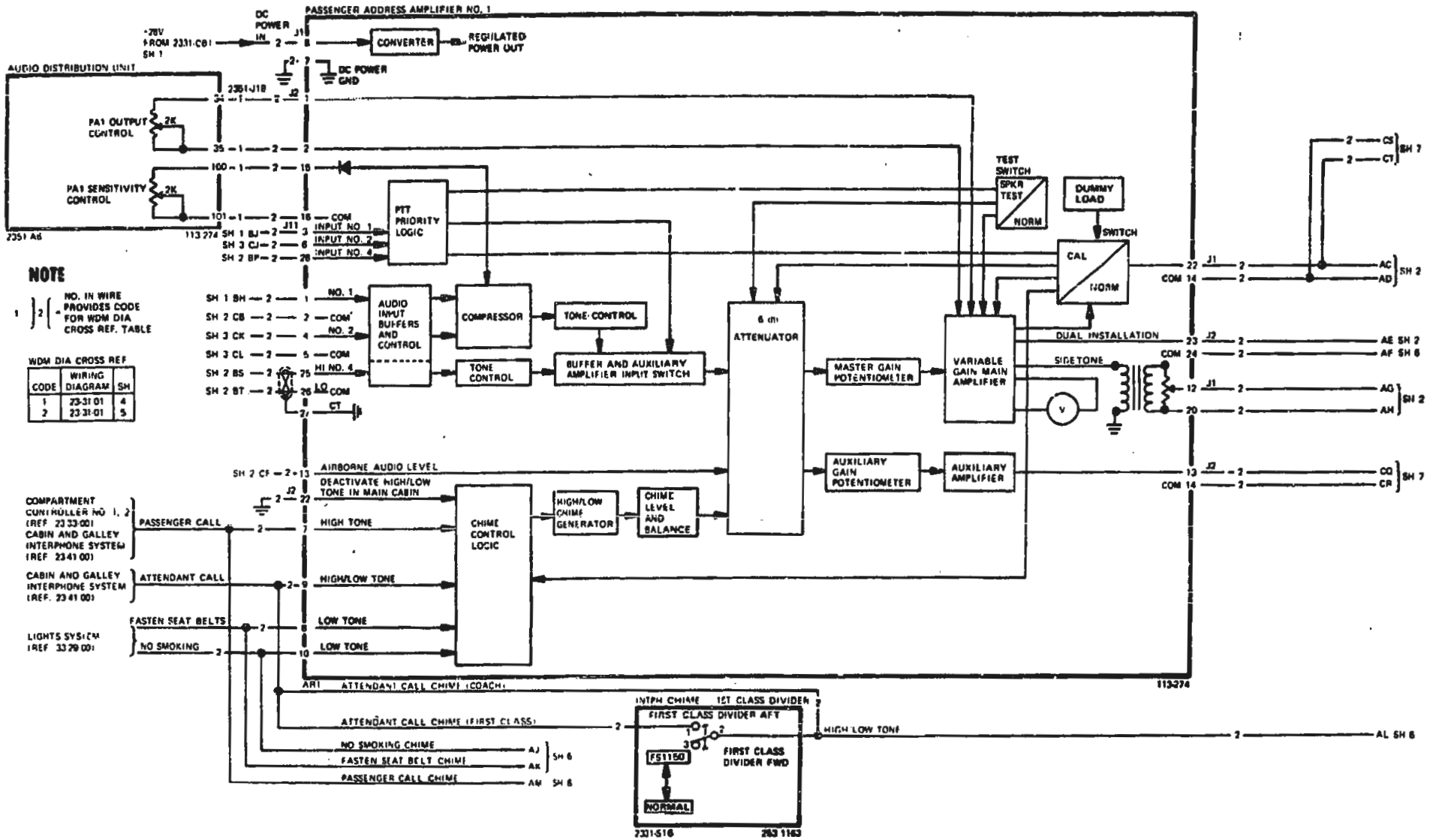
R
R
0018 EFFECTIVITY: 001-031



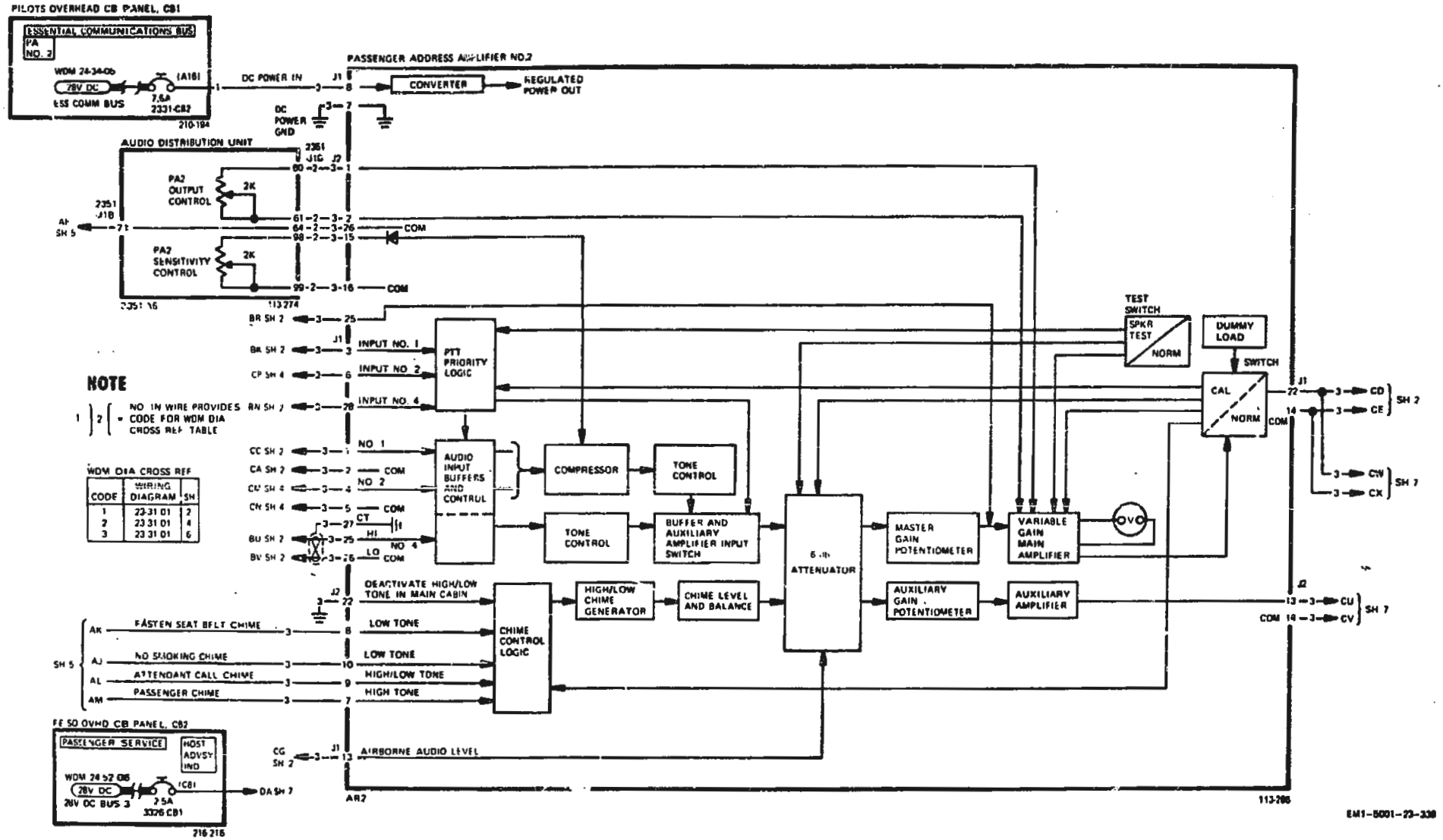
EM1-59401-23-338

Passenger Address System Schematic
SCHEM 1 (Sheet 4)

R
R
001B EFFECTIVITY: 001-031

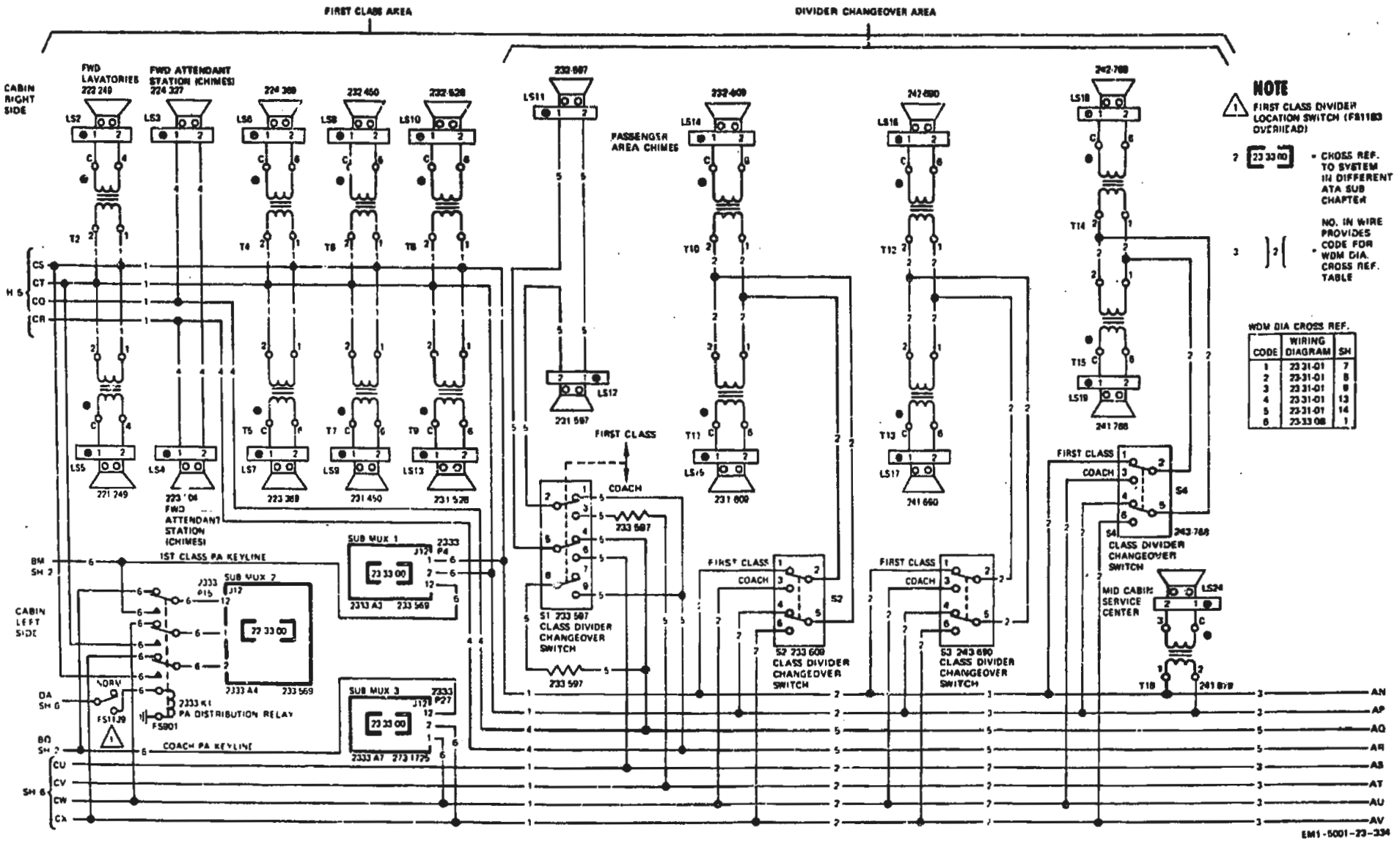


Passenger Address System Schematic
SCHEM 1 (Sheet 5)



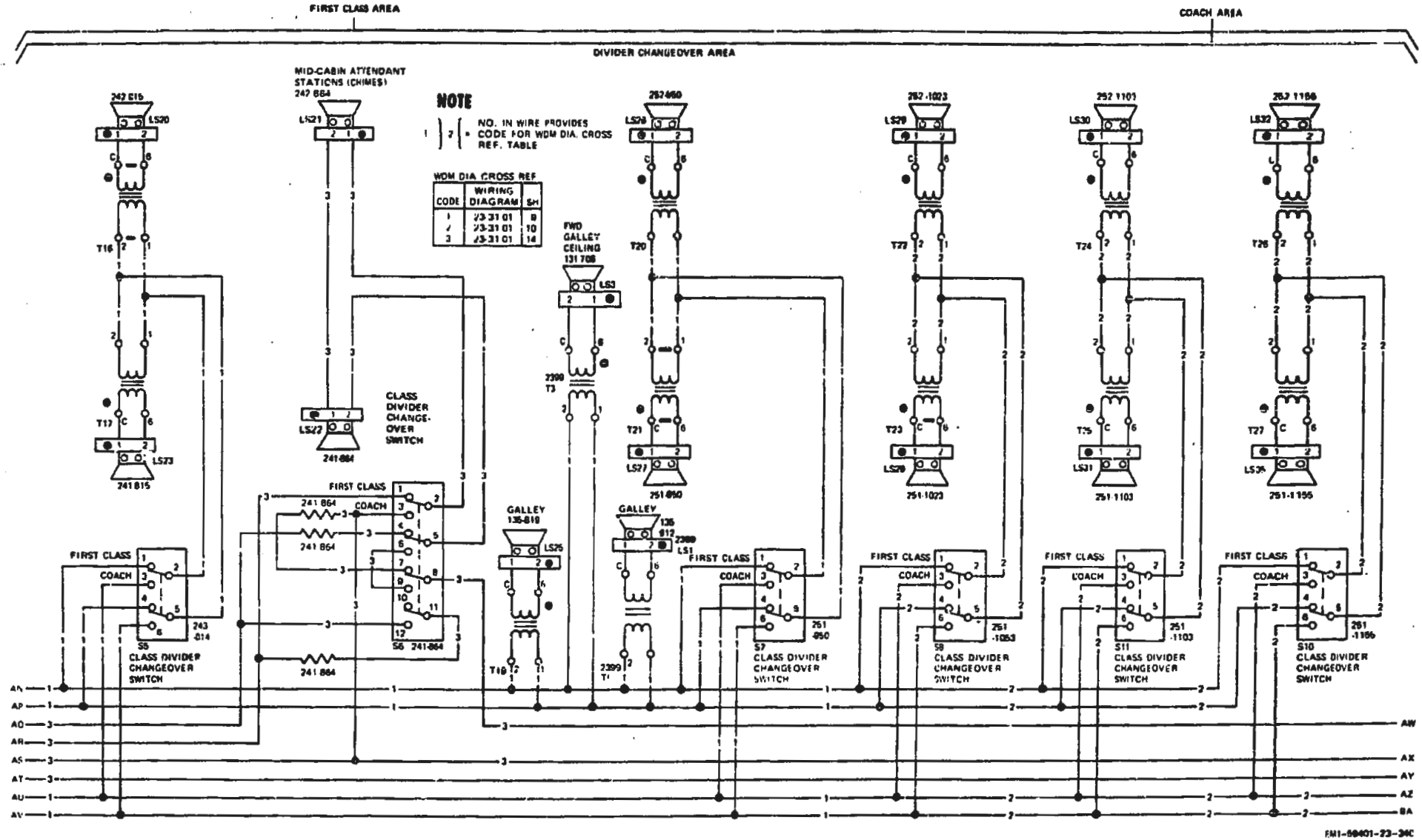
Passenger Address System Schematic
SCHEM 1 (Sheet 6)

R R 0018 EFFECTIVITY: 001-031



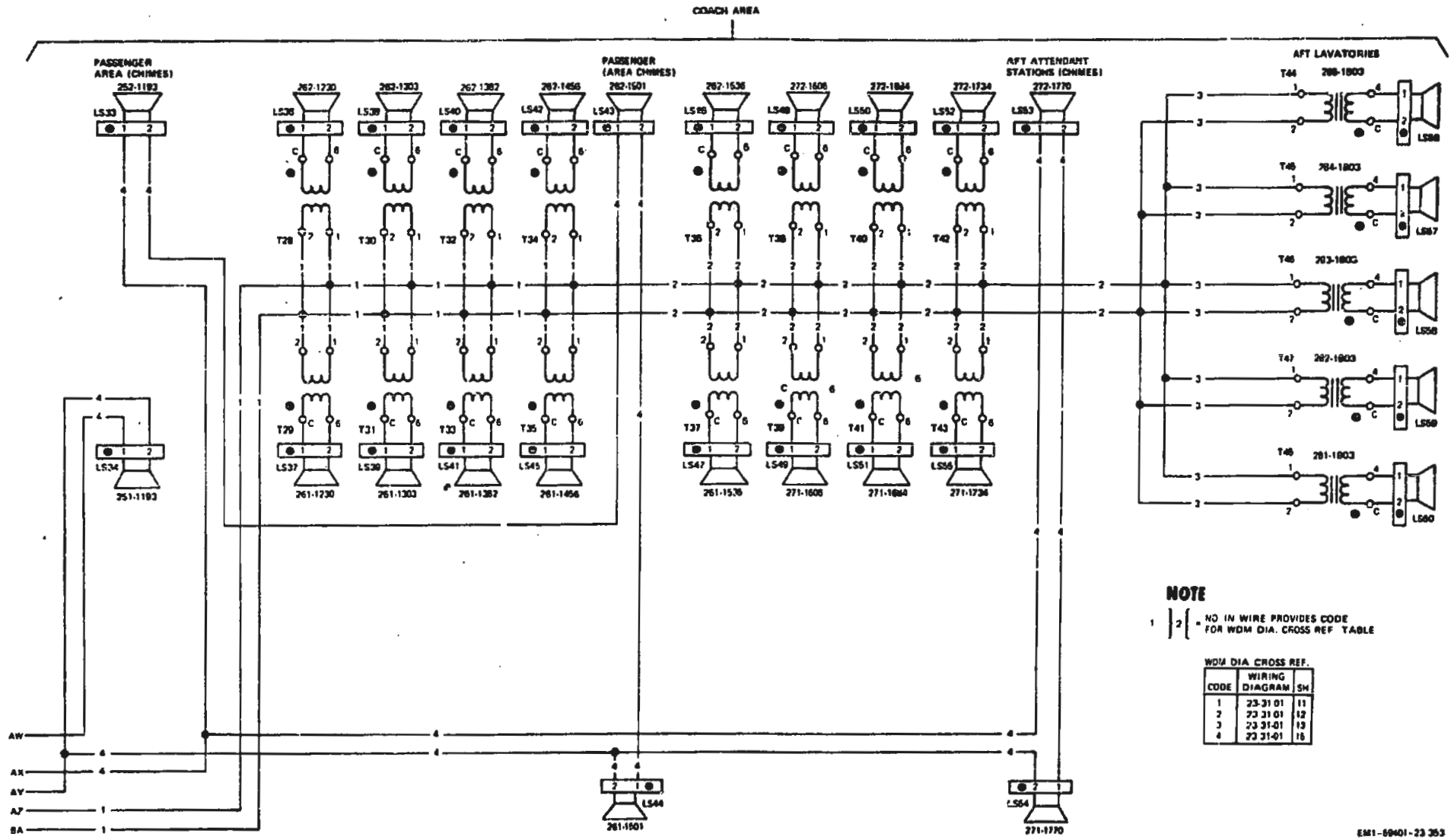
Passenger Address System Schematic
SCHEM 1 (Sheet 7)

R
R
0018 EFFECTIVITY: 001-031



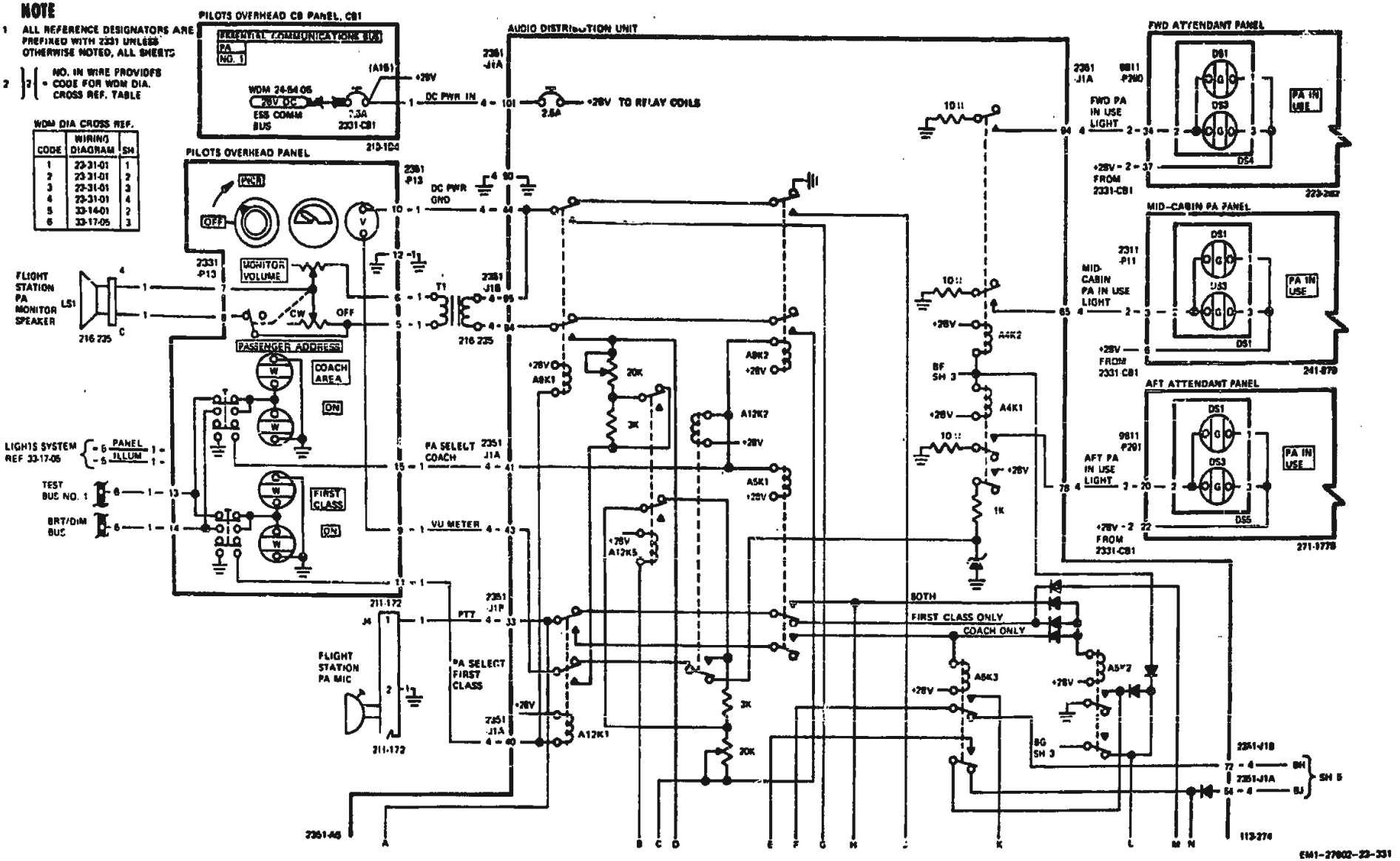
Passenger Address System Schematic
SCHEM 1 (Sheet 8)

R
R
0018 EFFECTIVITY: 001-031



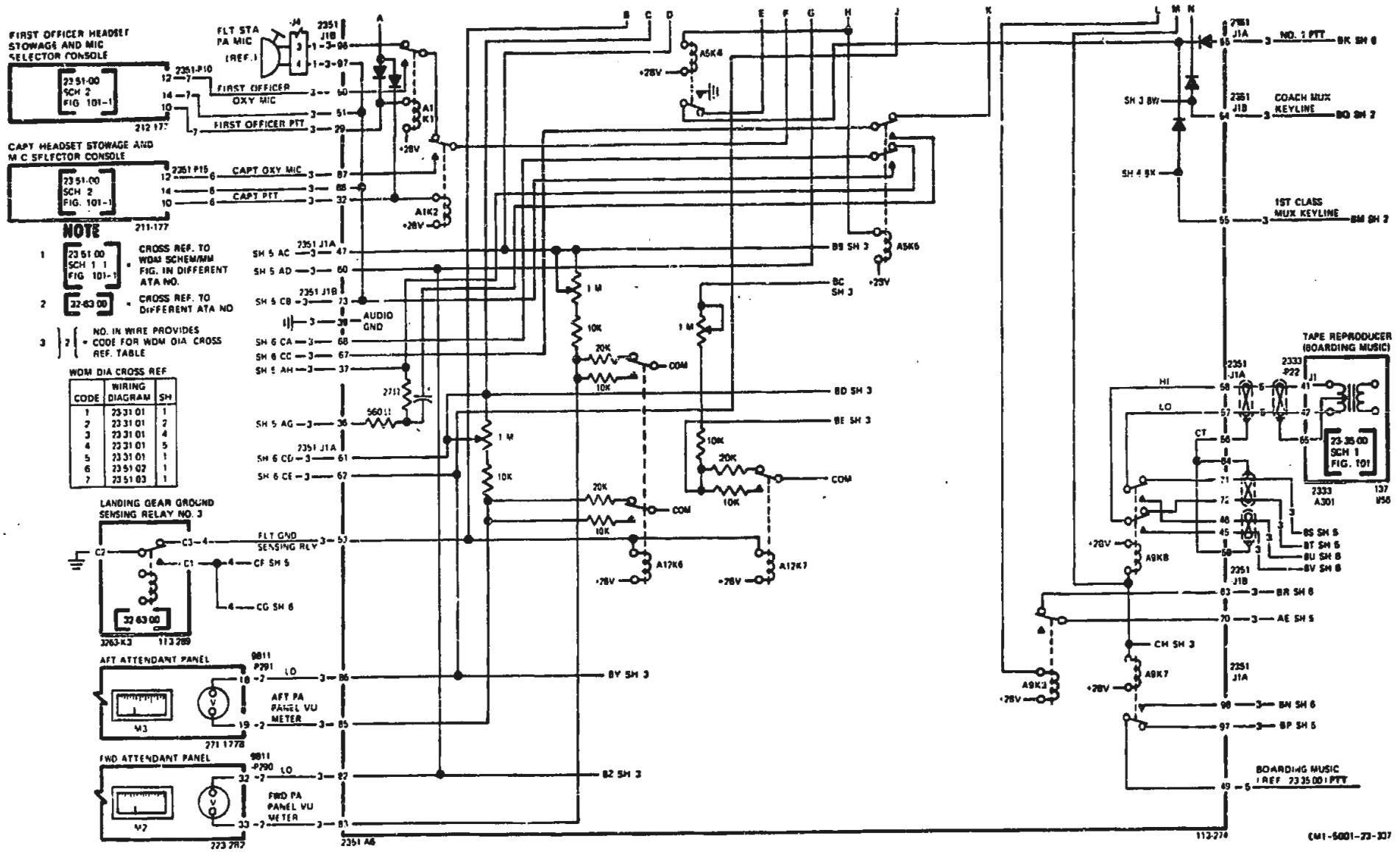
Passenger Address System Schematic
SCHEM 1 (Sheet 9)

R
R
001B EFFECTIVITY: 001-031



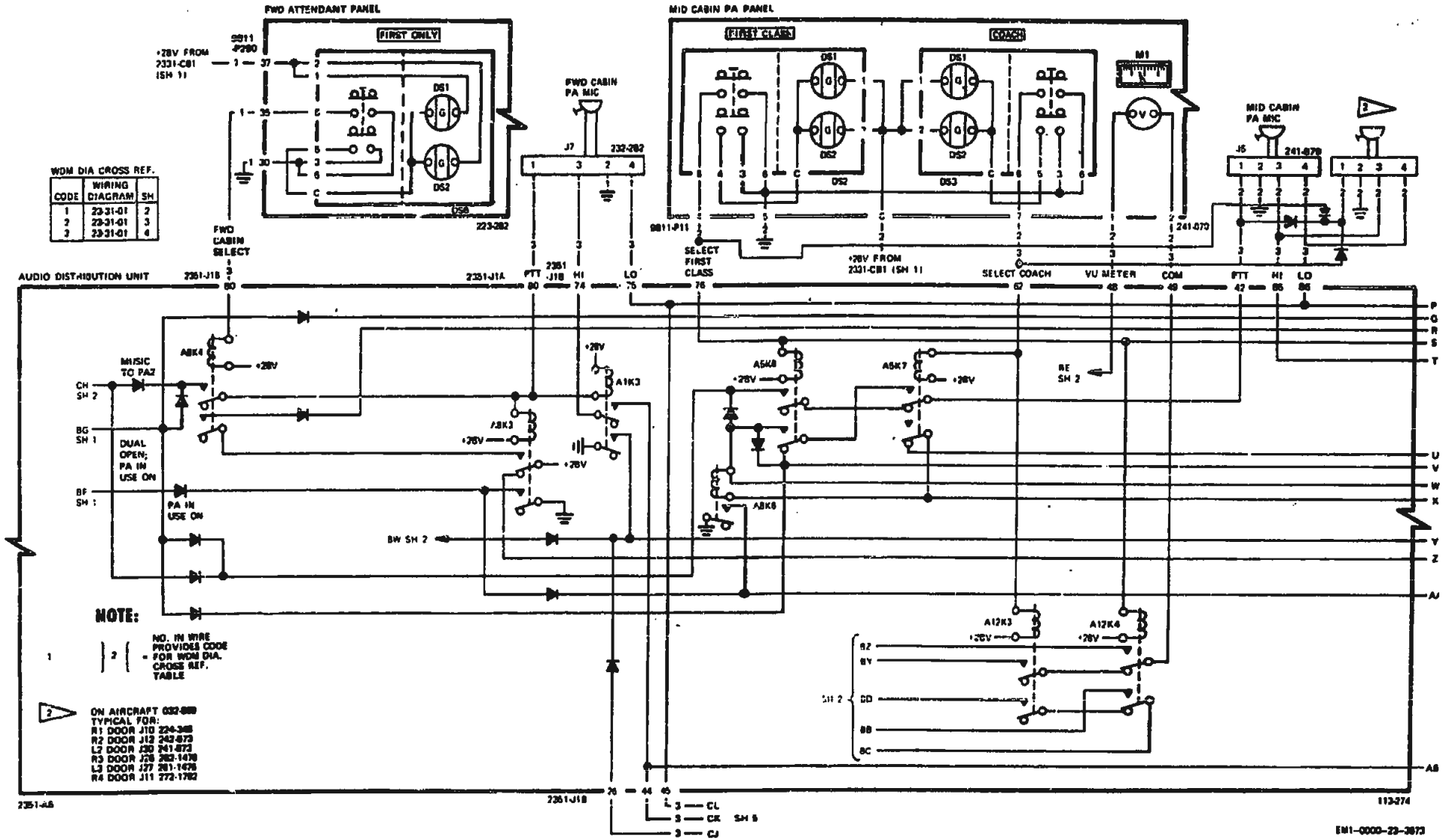
Passenger Address System Schematic
SCHEM 1 (Sheet 1)

EFFECTIVITY: 032-999


FIRST OFFICER HEADSET STOWAGE AND MIC SELECTOR CONSOLE
23 51-00 SCH 2 FIG 101-1
CAPT HEADSET STOWAGE AND M C SELECTOR CONSOLE
23 51-00 SCH 2 FIG. 101-1
NOTE
1 23 51 00 SCH 1 1 FIG 101-1 * CROSS REF. TO WDM SCHEM/MM FIG. IN DIFFERENT ATA NO.
2 32-63 00 * CROSS REF. TO DIFFERENT ATA NO
3 2 * NO. IN WIRE PROVIDES CODE FOR WDM DIA CROSS REF. TABLE
WDM DIA CROSS REF
CODE | WIRING DIAGRAM | SH
1 | 23 31 01 | 1
2 | 23 31 01 | 2
3 | 23 31 01 | 4
4 | 23 31 01 | 5
5 | 23 31 01 | 1
6 | 23 51 02 | 1
7 | 23 51 03 | 1
FLT STA PA MIC (REF.)
FIRST OFFICER OXY MIC
FIRST OFFICER PTT
CAPT OXY MIC
CAPT PTT
AUDIO GND
LANDING GEAR GROUND SENSING RELAY NO. 3
FLT GND SENSING RLY
AFT ATTENDANT PANEL
AFT PA PANEL VU METER
FWD ATTENDANT PANEL
FWD PA PANEL VU METER
NO. 1 PTT
COACH MUX KEYLINE
1ST CLASS MUX KEYLINE
BOARDING MUSIC (REF 23 35 00 PTT)
TAPE REPRODUCER (BOARDING MUSIC)
23-35 00 SCH 1 FIG. 101
+28V
COM
HI
LO
CT

R R Passenger Address System Schematic
SCHEM 1 (Sheet 2)

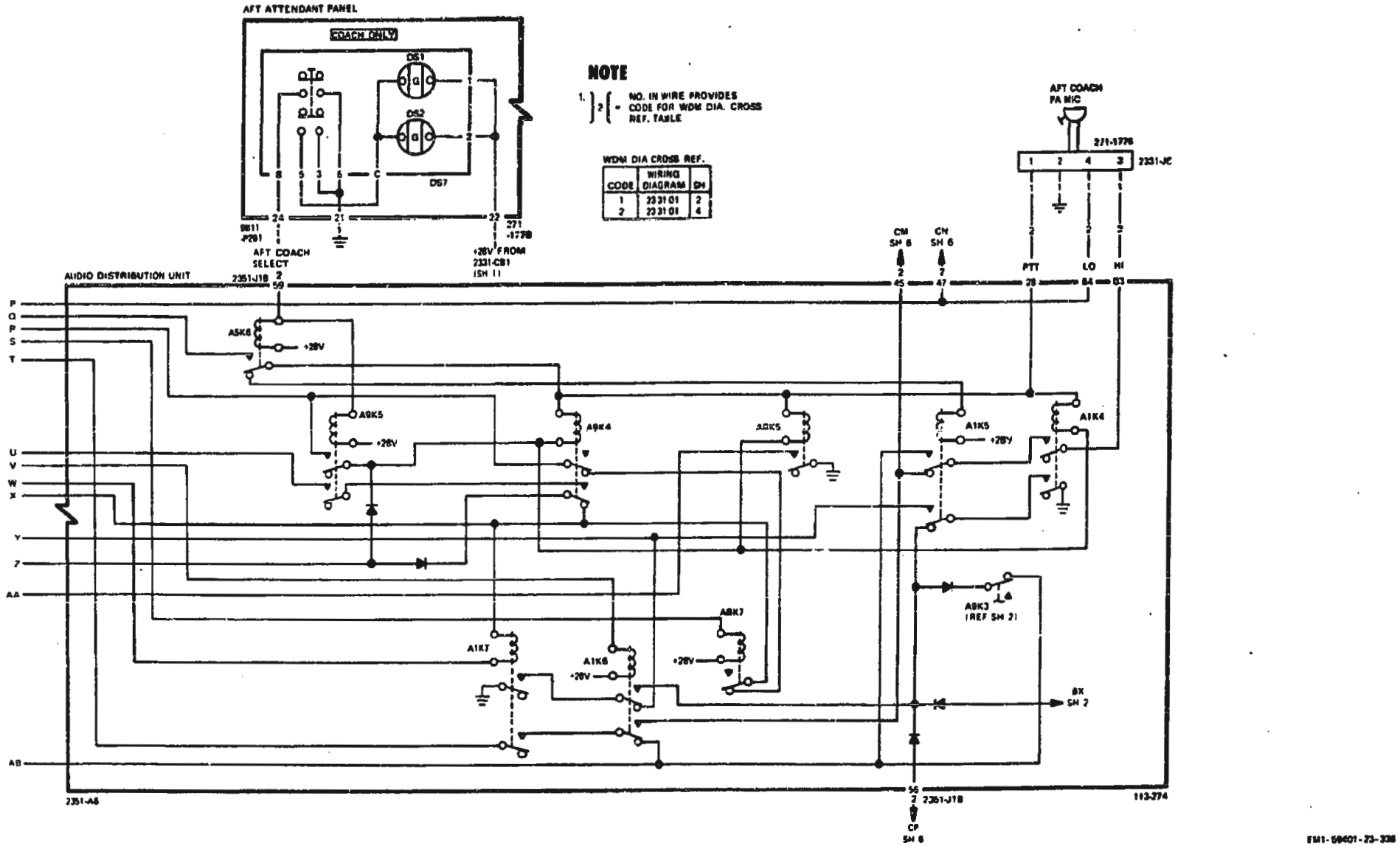
R R 001B EFFECTIVITY: 032-999



R Passenger Address System Schematic
R SCHEM 1 (Sheet 3)

R EFFECTIVITY: 032-999

R
001B

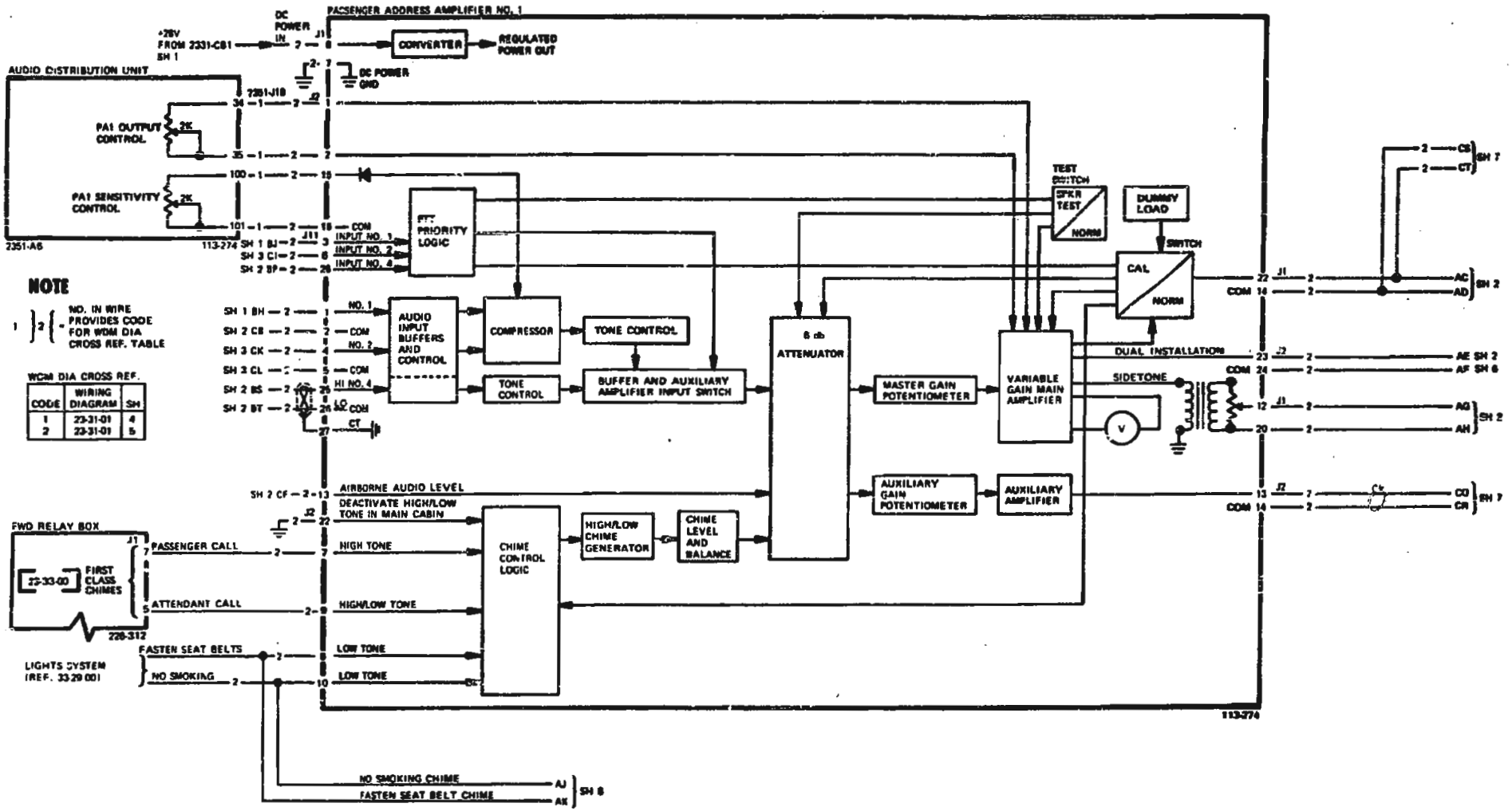


EM1-68601-23-338

Passenger Address System Schematic
SCHEM 1 (Sheet 4)

EFFECTIVITY: 032-999

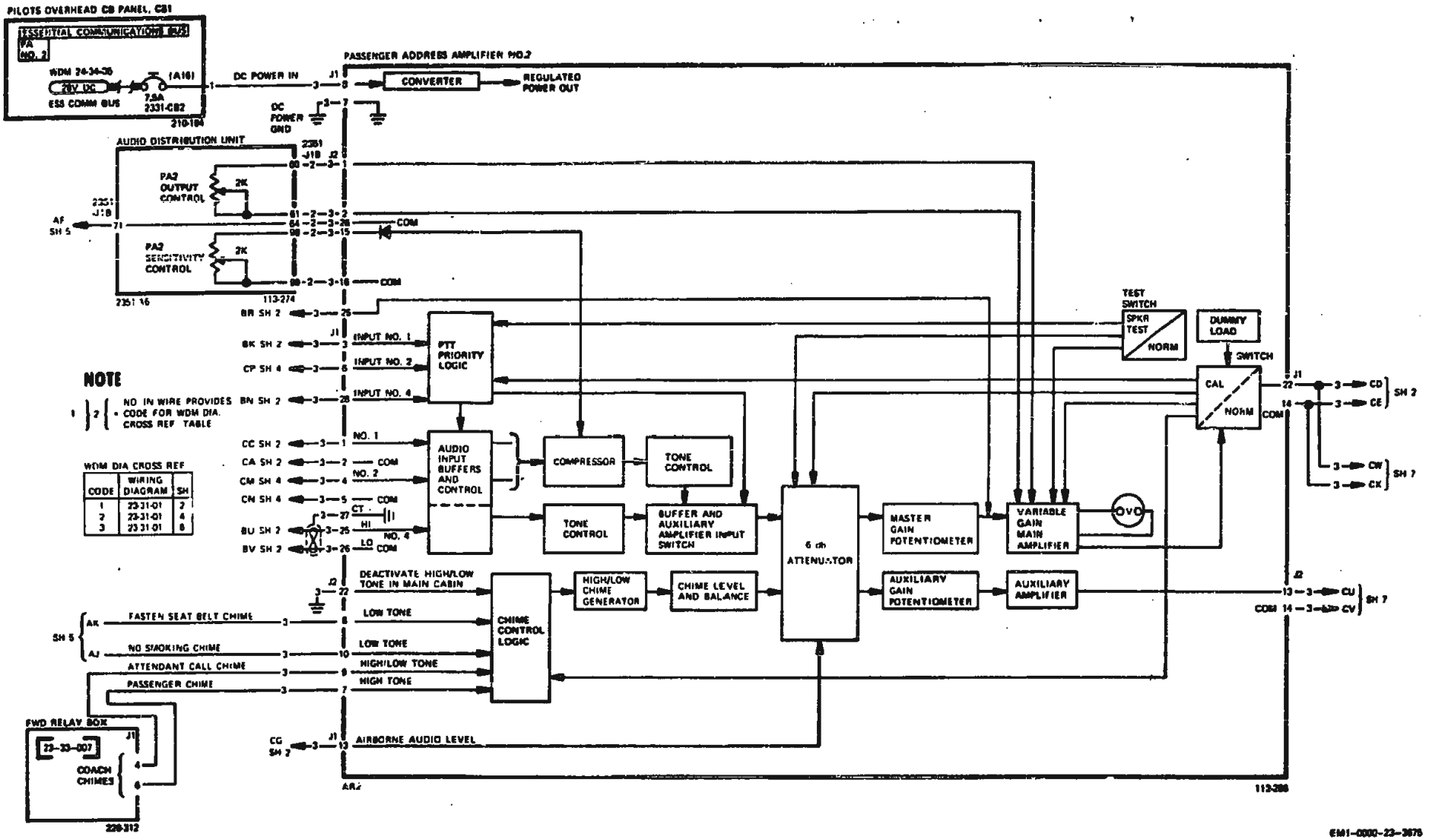
0018



Passenger Address System Schematic
SCHEM 1 (Sheet 5)

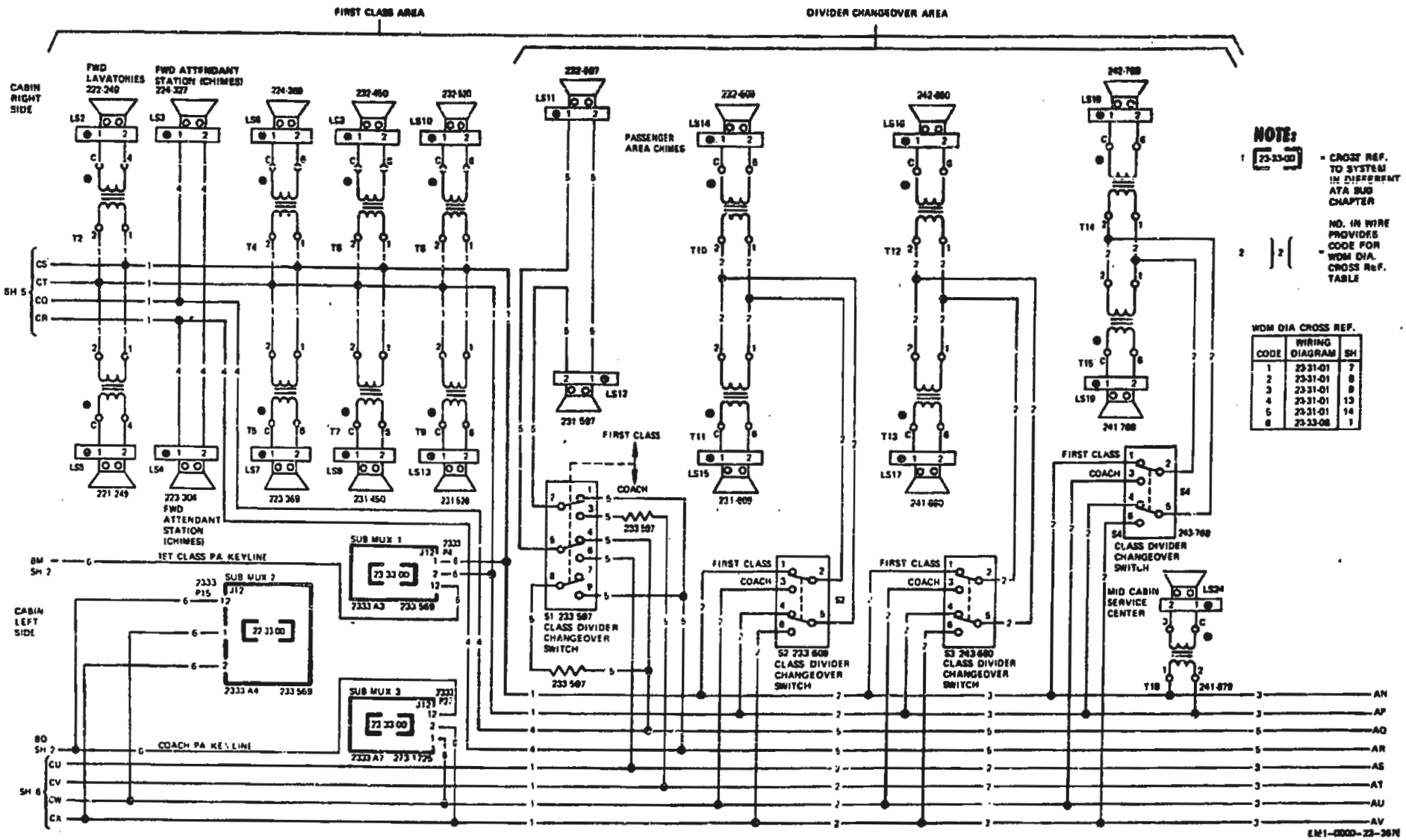
EFFECTIVITY: 032-999

001B



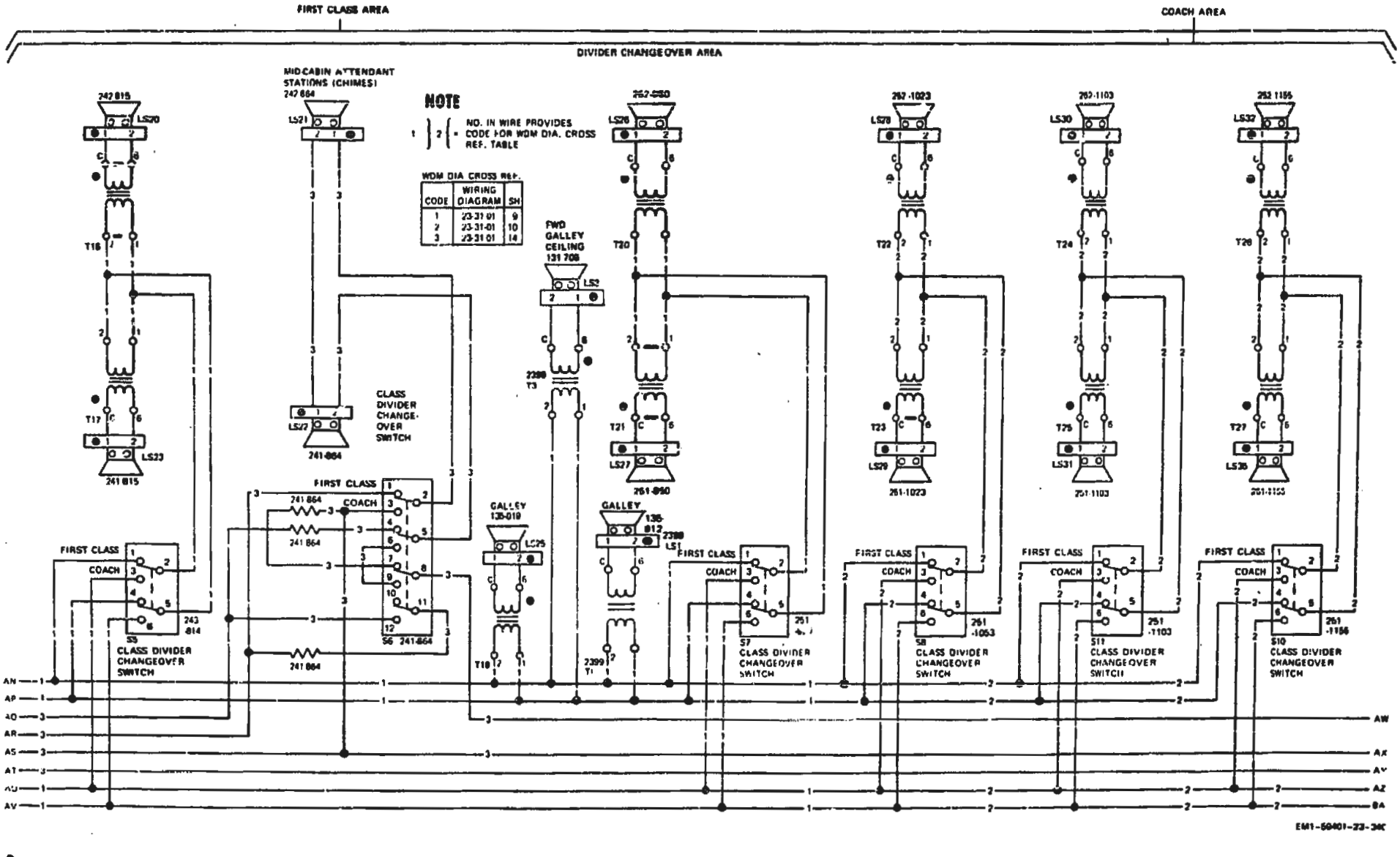
R Passenger Address System Schematic
R SCHEM 1 (Sheet 6)

R EFFECTIVITY: 032-999
R
001B


FIRST CLASS AREA
DIVIDER CHANGEOVER AREA
CABIN RIGHT SIDE
FWD LAVATORIES 222-249
FWD ATTENDANT STATION (CHIMES) 224-327
PASSENGER AREA CHIMES
NOTE:
1 23-33-00 - CROSS REF. TO SYSTEM IN DIFFERENT ATA SUB CHAPTER
2 - NO. IN WIRE PROVIDES CODE FOR WDM DIA. CROSS REF. TABLE
WDM DIA CROSS REF.
CODE | WIRING DIAGRAM | SH
1 | 23-31-01 | 7
2 | 23-31-01 | 8
3 | 23-31-01 | 9
4 | 23-31-01 | 13
5 | 23-31-01 | 14
6 | 23-33-06 | 1
FIRST CLASS
COACH
CLASS DIVIDER CHANGEOVER SWITCH
MID CABIN SERVICE CENTER
SUB MUX 1
SUB MUX 2
SUB MUX 3
CABIN LEFT SIDE
1ST CLASS PA KEYLINE
COACH PA KEYLINE
FWD ATTENDANT STATION (CHIMES)
EM1-0000-23-38N

R
R Passenger Address System Schematic
SCHEM 1 (Sheet 7)

R EFFECTIVITY: 032-999
R
0018

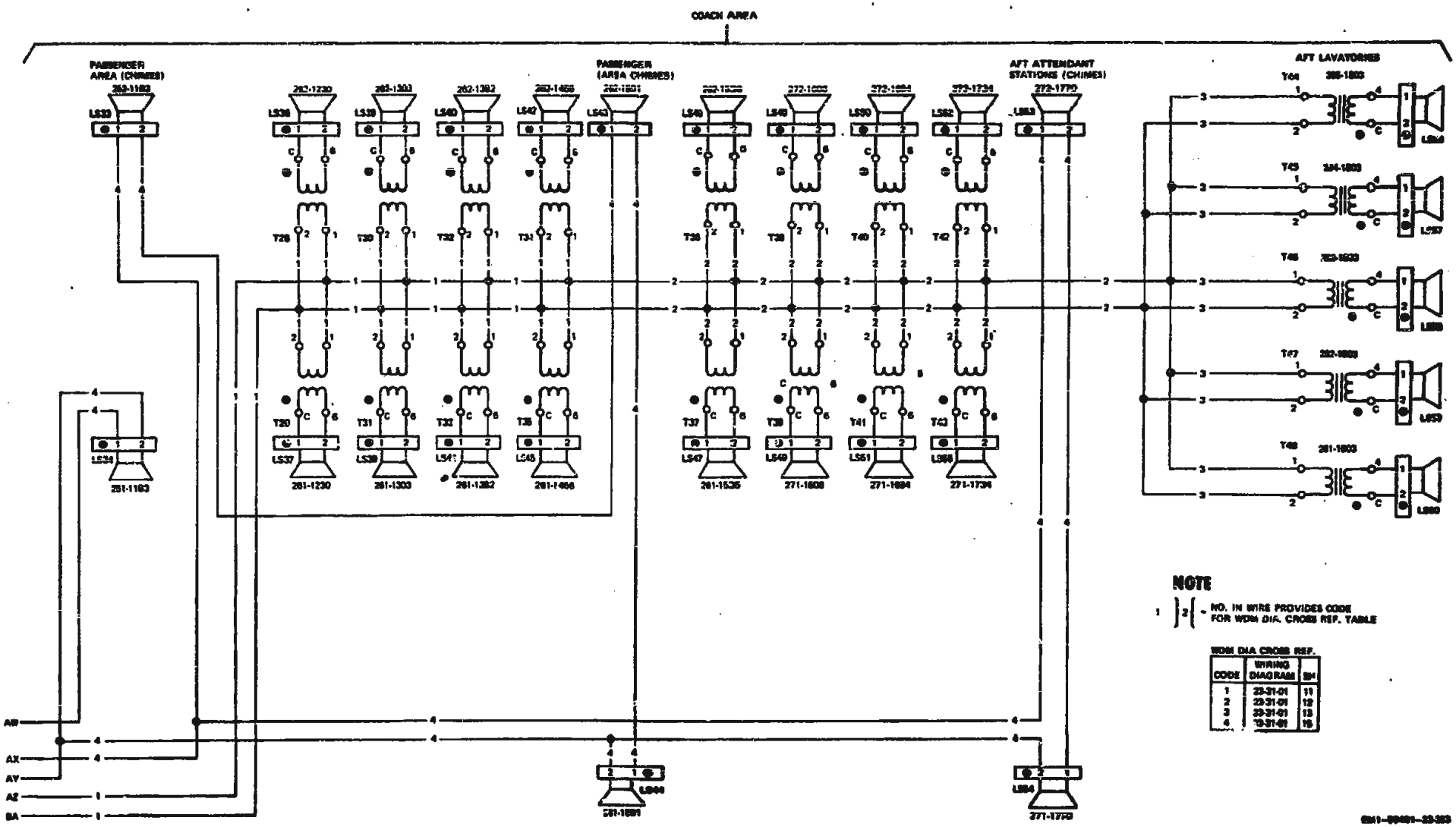


EM1-50401-23-3C

Passenger Address System Schematic
SCHEM 1 (Sheet 8)

EFFECTIVITY: 032-999

001B



Passenger Address System Schematic
SCHEM 1 (Sheet 9)

PASSENGER ADDRESS SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test
23-35-00	Boarding Music System - Adjustment and Test
23-41-00	Cabin and Galley Interphone System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
32-63-00	Air/Ground Sensing System

2. Adjustment/Test

A. BITE (Built In Test Equipment)

(1) Turn on electrical power (Ref. 24-00-00).

(2) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and No. 2 (A16) are closed.

(3) In forward electronic service center at rear rack bottom shelf, zone 113, locate PA amplifier No. 1.

NOTE: PA amplifier No. 1 drives right bank of PA speakers, plus flight station, right forward lavatory, and aft lavatory No. 4 and No. 5 PA speakers.

PA amplifier No. 2 drives left bank of PA speakers, the lower galley PA speakers, plus left forward lavatory and aft lavatory No. 1, No. 2, and No. 3 PA speakers.

(a) On amplifier front panel, select PA TEST position on NORM/PA TEST switch.

(b) Verify that test tone is loud and clear in all speakers driven by amplifier No. 1.

CAUTION: DO NOT OPERATE AMPLIFIER IN CAL FOR LONGER THAN 30 SECONDS.

CR DO NOT ANNOUNCE THROUGH PA SYSTEM WHILE IN CAL.

(4) On amplifier front panel, return NORM/PA TEST switch to NORM position, and select CAL position on NORM/CAL switch.

(a) Verify that meter on amplifier front panel indicates 0 (±1) dB.

(b) Return NORM/CAL switch to NORM position.

(5) Repeat Steps 2A(3) and (4) for PA amplifier No. 2.

(6) Turn off electrical power (Ref. 24-00-00).

CR CAUTION: DO NOT OPERATE AMPLIFIER IN CAL POSITION FOR LONGER
CR THAN 30 SECONDS.

CR DO NOT ANNOUNCE THROUGH PA SYSTEM WHILE IN CAL.

B. Operational Test

C NOTE: Also, See Test - P.A. System Acoustics, 23-31-00, Pgs
C 508 and 509/510.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO.1 (A15) and NO. 2 (A16) are closed.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breakers PASSENGER SERVICE - ORD LT (C11) and HOST ADVSY IND (C8) (on aircraft 001-031 only) are closed.

C (3) At the forward left attendants BOARDING MUSIC AND
C ENTERTAINMENT panel, depress AUDIO-ON switchlight.
C Switch ON the boarding music toggle switch, select
C channel 1, 2, 3, or 4 and adjust the volume control for
C a comfortable audio level in the cabin.

(a) Verify that boarding music can be heard on PA speakers in all areas of the passenger compartment and lower galley (open lift door to listen).

C (4) During the following PA tests, monitor the passenger
C entertainment at one seat in first class (Zone A) and

C one seat in coach (Zone B) using tubular earsets and
C selected to any music channel

(5) At the mid cabin service center, depress the COACH switchlight. Key and speak into the P.A. microphone.

(a) Verify that the COACH and P.A. IN USE lights come
C on, the PA microphone overrides boarding music and
C entertainment music in the coach area, microphone voice is loud and clear over all PA speakers in the coach area, and VU meter deflection follows voice input.

C (b) Verify that FIRST CLASS ENTERTAINMENT is
C undisturbed.

NOTE: PA speakers fore and aft of P3 doors at FS 609, 690, 768, 815, 950, 1023, 1103, and 1155 can be switched to operate for first class or coach announcements. The eight P.A. speaker FIRST CLASS/COACH switches are located above the ceiling panels on the left side of the cabin adjacent to the P.A. speakers.

C (6) Depress the FIRST CLASS switchlight. Key and speak into the P.A. microphone.

(a) Verify that the FIRST CLASS, COACH, and PA IN USE lights come on, the P.A. microphone overrides
C boarding music and entertainment music in all passenger compartment areas and the lower galley, microphone voice is loud and clear over all P.A. speakers in all passenger compartment areas and the lower galley, and VU meter deflection follows voice input.

On aircraft 032-999,
key and speak into each of the R1, R2, R3, R4, L2 and L3 door position microphones.

(b) Verify that each door position microphone overrides boarding music and entertainment music in all passenger compartment areas and the lower galley, microphone voice is loud and clear over all PA speakers in all passenger compartment areas and the lower galley, and VU meter deflection follows voice input.

NOTE: The door position microphones are electrically paralled with the mid cabin service center microphone but do not have

selective capabilities. The PA override result at the door positions is not affected by the FIRST CLASS or COACH switchlight position at any other PA station.

(7) At the aft left cabin attendants position, depress the COACH ONLY switchlight. Key and speak into the P.A. microphone.

(a) Verify that the COACH ONLY and PA IN USE lights come on, the P.A. microphone overrides boarding
C music and entertainment music in the coach area and aft lavatories, microphone voice is loud and clear over all P.A. speakers in the coach area and aft lavatories, and VU meter deflection follows voice input.

C (b) Verify that first class entertainment is
C undisturbed.

(c) Release COACH ONLY switchlight. Key and speak into the P.A. microphone.

(d) Verify that PA IN USE light comes on, PA
C microphone overrides boarding music and
C entertainment musicin all passenger compartment areas, microphone voice is loud and clear over all P.A. speakers in all passenger compartment areas, and VU meter deflection follows voice input.

(8) At the forward left cabin attendants position, depress the FIRST ONLY switchlight. Key and speak into the P.A. microphone.

(a) Verify that the FIRST ONLY and PA IN USE lights
C come on, P.A. microphone overrides boarding music
C and entertainment music in the first class area and the forward lavatories, microphone voice is loud and clear over all P.A. speakers in the first class area and forward lavatories, and VU meter deflection follows voice input.

C (b) Verify that the coach entertainment is
C undisturbed.

C (9) Release the FIRST ONLY switchlight. Key and speak into the P.A. microphone.

(a) Verify that the PA IN USE light comes on, P.A.
C microphone overrides boarding music and
C entertainment music in all passenger compartment

areas, microphone voice is loud and clear over all P.A. speakers in all passenger compartment areas, and VU meter deflection follows voice input.

C C C (10) In the flight station on the pilots overhead panel PASSENGER ADDRESS control panel, depress FIRST CLASS and COACH AREA switchlights. While holding the forward left cabin attendants P.A. microphone keyed, key and speak into the flight station P.A. microphone.

(a) Verify that the flight station P.A. microphone input overrides both the forward left cabin C C attendants PA microphone and boarding music and entertainment music, and that microphone voice is loud and clear in all passenger compartment areas, over all P.A. and chime speakers.

C C (11) Remove tubular earsets and cease monitoring entertainment.

(12) At the forward left cabin attendants position, remove the cabin and galley interphone handset from the cradle (Ref. 23-41-00). Select each of the following positions on the thumbwheel, and at each position depress the CALL button: UP GAL; FWD CAB; MID CAB; and AFT CAB.

(a) At each position when the CALL button is depressed, verify that the chime speakers in the coach area sound a HI/LO chime.

NOTE: Position of FIRST CLASS/COACH switches above ceiling by chime speakers at FS 597 and 864 determines whether corresponding speakers will sound first class or coach chimes.

With INTERPHONE CHIME - CLASS DIVIDER switch (above ceiling by Sub-multiplexer No. 2 at FS 1163) in FWD OF GALLEY LIFT, HI-LO chime will sound in coach area only. With switch in AFT OF GALLEY LIFT, HI-LO chime will sound in all passenger compartment areas.

(13) Select 1 CLASS position and depress the CALL button as in (12) above.

(a) Verify that the chime speakers in the first class area sound a HI/LO chime.

NOTE: With INTERPHONE CHIME - CLASS DIVIDER switch in FWD OF GALLEY LIFT, HI-LO chime will sound in first class area only. With switch in AFT OF

GALLEY LIFT, HI-LO chime will sound in all passenger compartment areas.

(14) At one or more passenger seats in the first class and coach areas, pull the attendant call button (Ref. 23-33-00).

(a) Verify that the chime speakers for the corresponding class area sound a HI chime tone.

NOTE: CHIME switch on MULTIPLEXER PSS/PES TEST panel must be in ON position (Ref. 23-33-00).

C On aircraft 001-031,
C with PA DISTRIBUTION - 1st CLASS DIVIDER
C LOCATION switch (FS1163, above ceiling by
C sub-multiplexer No. 2) in NORMAL position, first
C class seat attendant calls sound HI chime in
C first class area (P.A. Amplifier No. 1 chime
C speakers), and coach seat attendant calls sound
C HI chime in coach area (P.A. Amplifier No. 2
C chime speakers).

C On aircraft 001-031,
C with switch in STA 1139 position, attendant
C calls from seats in passenger service system
C community 1 will sound HI chime in first class
C area only when community 1 is under control of
C compartment controller No. 1 (Ref. 23-33-00).
C Attendant calls from community 2 seats will
C sound HI chime in coach area.

(b) Depress call button to reset call circuits.

(15) In the flight station at the First Officers position, remove the oxygen mask from the console (Ref. 23-51-00). At the headset stowage and microphone selector console, depress the PA ON OXY switchlight and the PRESS TO TALK switch. Speak into the oxygen mask
C microphone while turning the flight station PASSENGER
C ADDRESS panel MONITOR VOLUME control.

(a) Verify that microphone voice is loud and clear from the flight station PA speaker and in all passenger compartment areas, the MONITOR VOLUME control operates properly, and the dB meter follows voice input.

(b) Release the First Officers PA ON OXY switchlight and stow the oxygen mask.

(16) At the Captains position, remove the oxygen mask from the console. At the headset stowage and microphone selector console, depress the PA ON OXY switchlight and the PRESS TO TALK switch. Speak into the oxygen mask microphone.

(a) Verify that microphone voice is loud and clear in all passenger compartment areas.

WARNING: OBSERVE ALL APPLICABLE WARNING AND CAUTION NOTES BEFORE OPENING MLG GND SENSE CIRCUIT BREAKER (Ref. 32-63-00).

(b) While holding the PRESS TO TALK switch depressed, open the MLG GND SENSE circuit breaker (Flight Engineer/Second Officers overhead circuit breaker panel CB2, L8). Continue to speak into the oxygen mask microphone.

(c) Verify that the sound level increases (doubles) in all passenger compartment areas.

(d) Close MLG GND SENSE circuit breaker.

(17) On pilots eyebrow panel INTERIOR LIGHTS panel, depress first FASTEN SEAT BELTS switchlight, then NO SMOKING switchlight.

(a) As each switchlight is depressed, verify that a LO chime sounds in all P.A. speakers and chime speakers.

(b) Release FASTEN SEAT BELTS and NO SMOKING switchlights.

(c) Verify that a LO chime sounds in all P.A. speakers and chime speakers.

C C (18) On pilots overhead panel PASSENGER ADDRESS panel, release FIRST CLASS switchlight. Key and speak into the flight station P.A. microphone.

(a) Verify that boarding music continues in first class area, P.A. microphone overrides boarding music in coach area, and microphone voice is loud and clear over all P.A. and chime speakers in the coach area.

(b) Release COACH AREA switchlight, and depress FIRST CLASS switchlight. Key and speak into P.A. microphone.

(c) Verify that boarding music continues in coach area, P.A. microphone overrides boarding music in first class area, and microphone voice is loud and clear over all P.A. and chime speakers in the first class area.

(19) Turn off boarding music (Ref. 23-35-00) and electrical power (Ref. 24-00-00).

C C. Test - P.A. System Acoustics

C (1) General

C (a) The following speaker test applies to all airplane
C installation configurations. This test provides
C microphone random noise input and speaker audio
C output measurements. However, this test is not a
C passenger cabin audio level test. Passenger cabin
C audio level is a function of the speakers,
C quantity and size, installed in the cabin which in
C turn is a function of basic airplane design. If
C individual speaker audio level output is within
C specific tolerance, then passenger cabin audio
C level will meet minimum requirements.

C (2) Equipment and Material

C (a) Random Noise Generator - Model 543-1, Pacific
C Electro Dynamics.

CR (b) Sound Level Meter - Realistic Model 33-2050.

C (3) Prepare to Test

C (a) Provide electrical power to airplane.

C (b) Check that all interphone, PA system and CREW CALL
C circuit breakers are closed.

C (4) Test - Passenger Address System

C (a) Closely couple noise generator to sound level
C meter.

C (b) Set sound level meter to C weighted scale.

C (c) Set noise generator PWR/PTT switch to ON and
C OUTPUT switch to SPKR. Check that sound level
C meter indicates 100 ± 1 dbA.

C NOTE: If reading is outside tolerance, check
C batteries of both units. If batteries are

C C good adjust noise generator for correct output.

C (d) Closely couple noise generator to PA
C microphone/handset at flight crew station.

C (e) Press PTT switch on microphone/handset.

C (f) Closely couple sound level meter to cabin speaker,
C moving meter across face of speaker for maximum
C indication on meter.

C NOTE: Do not measure output of speaker while
C meter is in motion as noise generated by
C movement may give a false indication.

C (g) With sound level meter set to C weighted scale
C check that speaker output is 99 +10 -2 dbA.

C (h) Place PA system in flight mode of operation (Ref.
C Passenger Address System - Adjustment Test).

C (i) Repeat step (g). Check that audio level increases
C by 6 dbA.

C (j) Place PA system in ground mode of operation.

C (k) Repeat steps (d) thru (g) for remaining passenger
C cabin speakers.

C (l) Repeat steps (d) thru (g) for other PA
C microphones/handsets.

C (m) Disconnect test equipment.

C (n) Remove electrical power if no longer required.

PASSENGER ADDRESS (PA) AMPLIFIER - REMOVAL AND INSTALLATION

1. Referenced Procedure

23-31-00 Passenger Address System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) for PA amplifier No. 1, or No. 2 (A16) for PA amplifier No. 2.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker PASSENGER SERVICE - ORD LT (C11).

(2) In forward electronic service center rear rack bottom shelf, zone 113, locate PA amplifier No. 1 or No.2 (Ref. Fig. 401).

(3) Release PA amplifier with front holddown extractor and remove PA amplifier.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Install PA amplifier in rack and secure with front holddown extractor (Ref. Fig. 401).

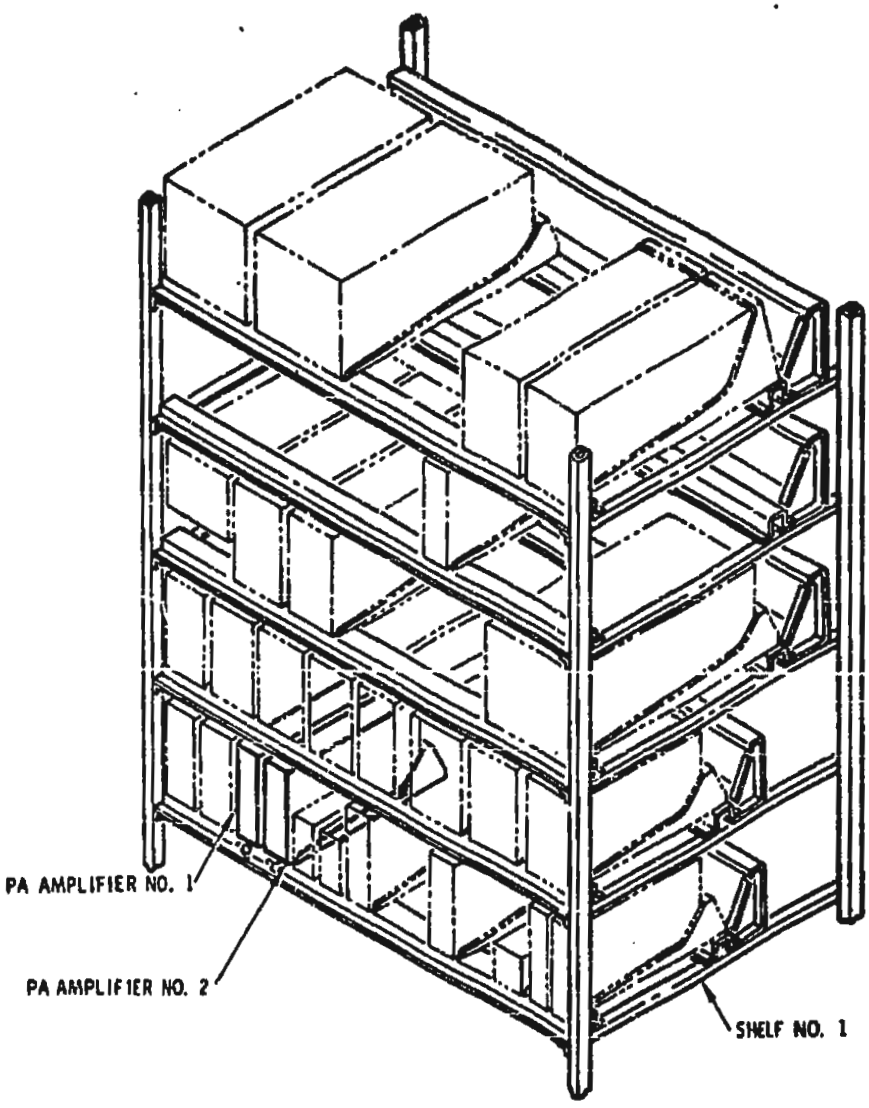
(3) Remove tags and close circuit breakers opened in Step 2A(1).

(4) Perform passenger address system operational test (Ref. 23-31-00, 501).

CR CAUTION: DO NOT OPERATE AMPLIFIER IN CAL POSITION FOR
CR LONGER THAN 30 SECONDS.

CR DO NOT ANNOUNCE THROUGH PA SYSTEM WHILE IN CAL.

ZONE 113



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK

HH 5246
M1-0100-23-413

R PA Amplifier - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

R

PA MICROPHONE - REMOVAL AND INSTALLATION

1. Referenced Procedure

24-00-00 Electrical Power - Maintenance Practices

2. Removal/Installation

NOTE: On aircraft 032-999, Removal and Installation procedures for attendant microphones located in door surrounds (Ref. Fig. 401) are identical to the forward and aft attendant panel positions.

A. Forward Left and Aft Left Attendant Positions - Removal

(1) At microphone connector, depress metal PUSH tab and pull on connector body to disconnect microphone (Ref. Fig. 401).

B. Forward Left and Aft Left Attendant Positions - Installation

(1) Align connector body with receptacle, and push firmly into place.

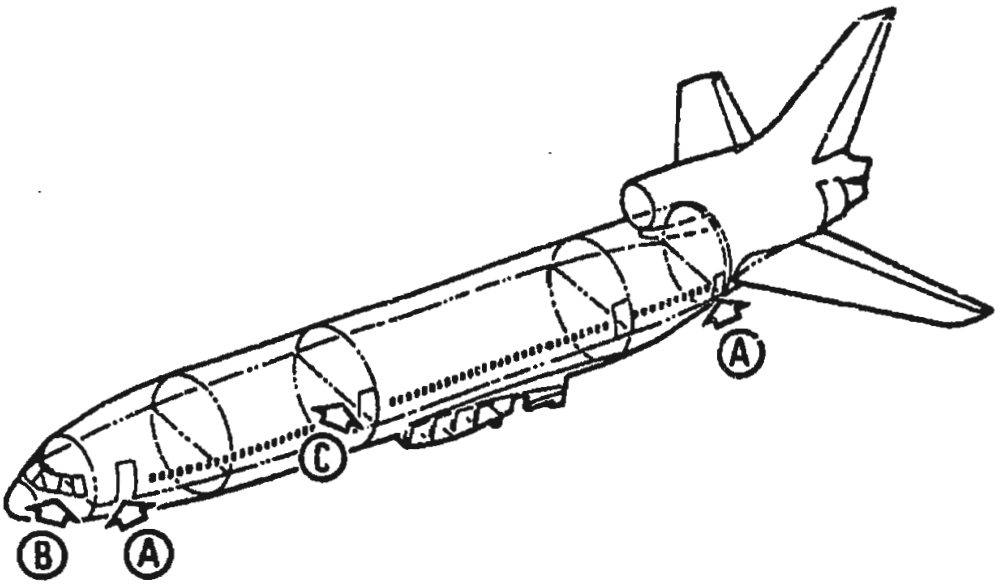
(2) Turn on electrical power (Ref. 24-00-00).

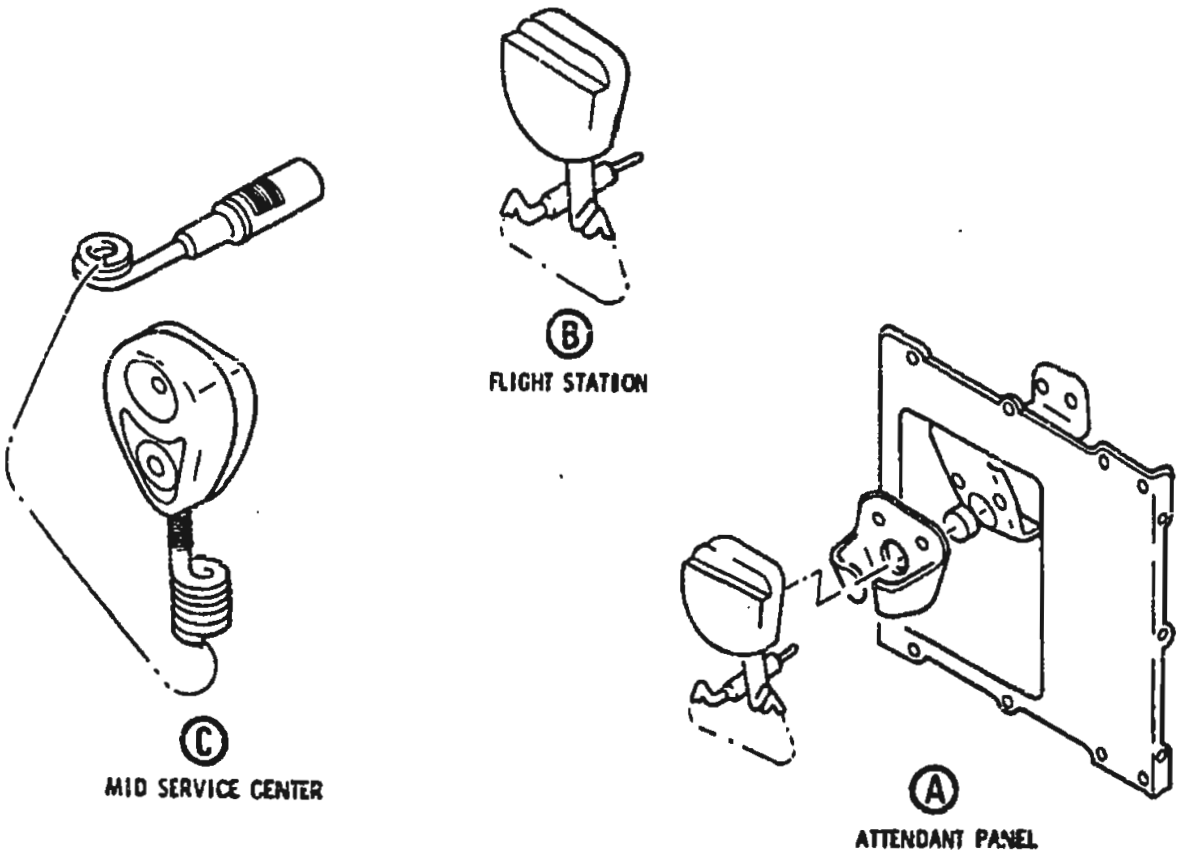
(3) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and NO. 2 (A16) are closed.

R R (4) Depress PA microphone press-to-talk switch and speak into microphone.

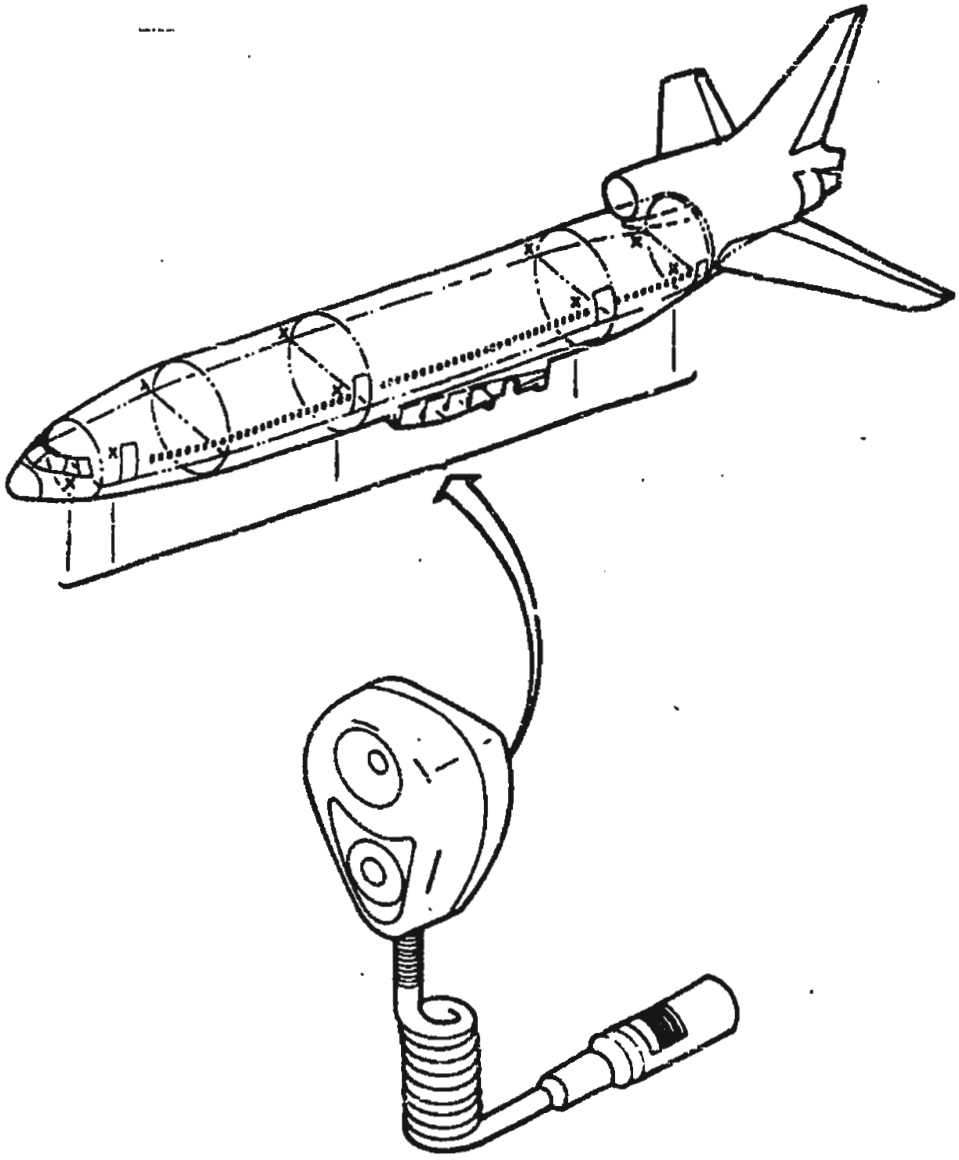
R R Verify that microphone voice is loud and clear over PA speakers.

(5) Turn off electrical power (Ref. 24-00-00).





R Passenger Address Microphones Removal and Installation
R Figure 401



TYPICAL OF ALL (10)
INCLUDING MID GALLEY

NOTE

HAND MICS AT THE L1 AND L4 DOORS ARE IN THE ATTENDANT PANELS. ALL OTHER PASSENGER COMPARTMENT MICS ARE IN DOOR SURROUNDS ADJACENT TO ATTENDANTS SEATS

MI-0000-23-1369

R Passenger Address Microphones
R Removal and Installation
R Figure 401

R EFFECTIVITY: 032-999
R
001B

C. Mid Cabin Service Center (Upper Galley) - Removal

(1) Insert screwdriver or eraser end of pencil into hole beside microphone connector and depress metal push tab.

(2) Pull on cable strain relief to disconnect microphone.

D. Mid Cabin Service Center (Upper Galley) - Installation

(1) Align connector body with receptacle, and push on cable strain relief until connector is firmly seated.

(2) Turn on electrical power (Ref. 24-00-00).

(3) On pilots overhead circuit breaker panel CB1, Zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and NO. 2 (A16) are closed.

R (4) Depress PA Microphone press-to-talk switch and speak
R into microphone.

R Verify that microphone voice is loud and clear over PA
R speakers.

(5) Turn off electrical power (Ref. 24-00-00).

SPEAKER TRANSFORMER - REMOVAL AND INSTALLATION

R 1. Reference Procedures

24-00-00 Electrical Power - Maintenance Practices

25-26-00 Passenger Compartment Trim and Insulation - Removal and Installation

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - No. 1 (A15) and No. 2 (A16).

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - CABIN & GALLEY INTPH (L7 - this breaker is only for removal and installation of flight station speaker transformer.)

(2) Cabin Speaker Transformer Removal

(a) Lower applicable ceiling panel (Ref. 25-26-00).

(b) Identify and tag transformer wires and disconnect spade lug terminations (Ref. Fig. 401).

(c) Remove mounting bolts and transformer.

(3) Lavatory Speaker Transformer Removal

(a) Lower applicable ceiling panel (Ref. 25-26-00).

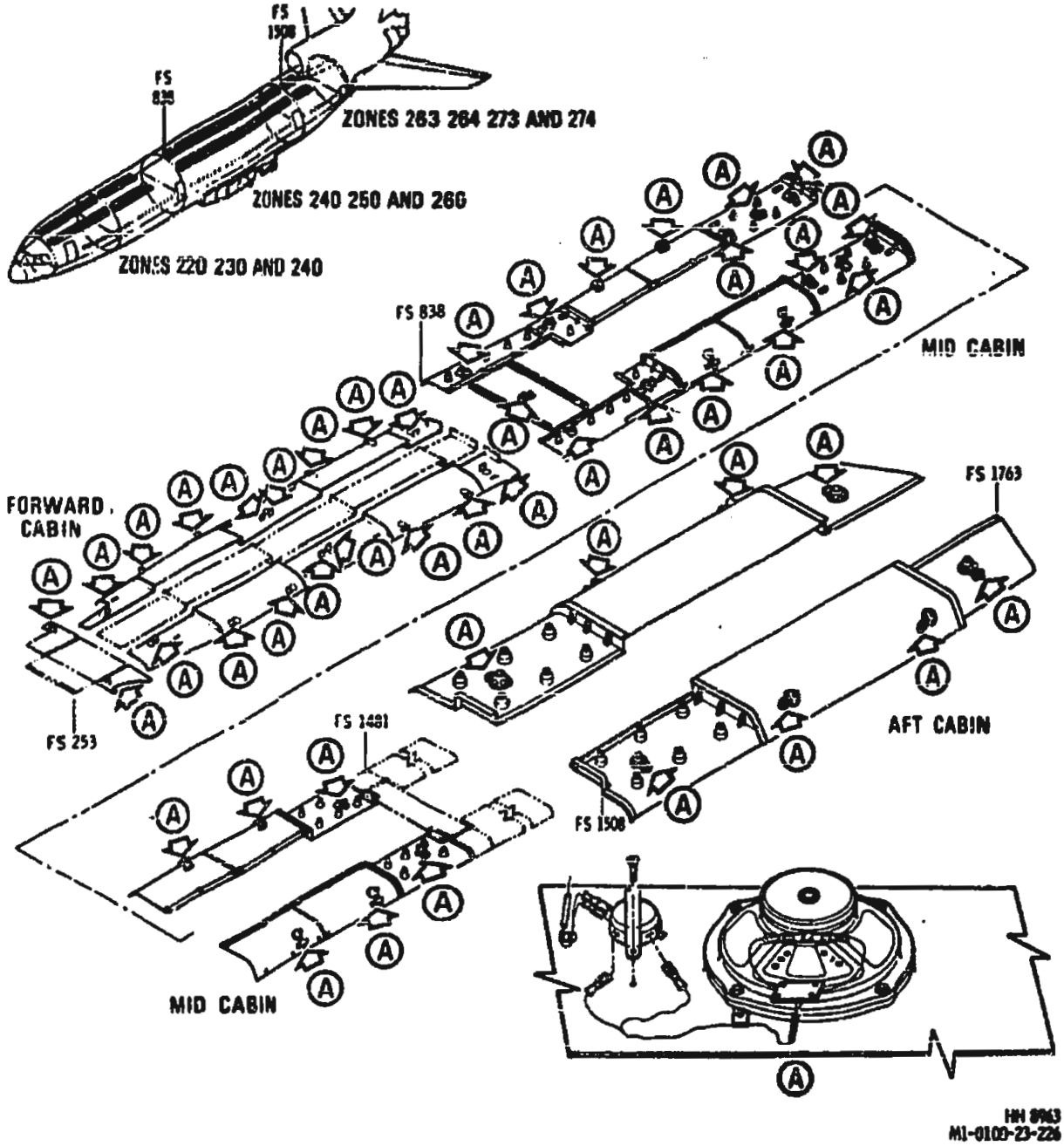
(b) Identify and tag transformer wires and disconnect spade lug terminations (Ref. Fig. 402).

(c) Remove mounting bolts and transformer.

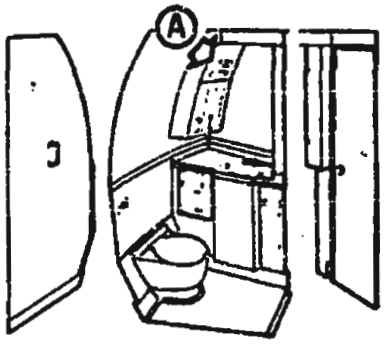
(4) Flight Station Speaker Transformer Removal

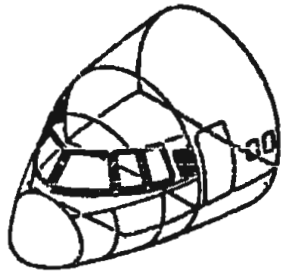
R (a) Remove mounting screws supporting speaker grille and speaker mounting panel (Ref. Fig. 403).

(b) Identify and tag transformer wires and disconnect spade lug terminations.

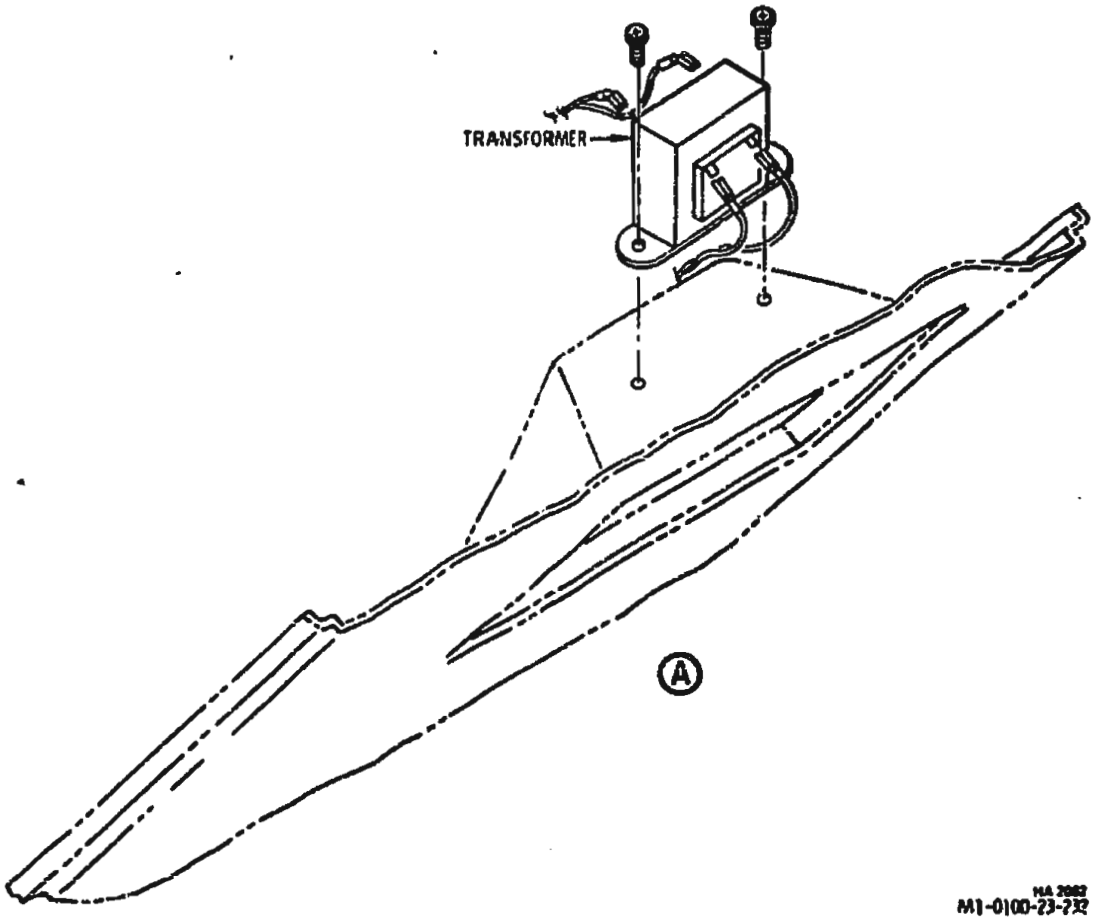


Cabin Speaker Transformer - Removal and Installation
Figure 401





ZONE 221 AND 222



MA 2662
M1-0100-23-232

Lavatory Speaker Transformer - Removal and Installation
Figure 402

(c) Disconnect electrical connector from electronic chime speaker.

(d) Remove mounting bolts and transformer.

(5) Galley PA Speaker Transformer Removal

(a) Near Door

R Remove screws supporting speaker grille mounting panel (Ref. Fig. 404 Sheet 1)

Identify and tag transformer wires and disconnect spade lug terminations

Remove mounting screws and transformer

(b) Near Sink

R Remove screws supporting speaker grille mounting panel (Ref. Fig. 404 Sheet 2)

Identify and tag transformer wires and disconnect spade lug terminations

Remove mounting screws and transformer

(c) On Forward Bulkhead

Remove nine screws attaching cover to speaker enclosure (Ref. Fig. 404 Sheet 3)

Identify and tag transformer wires and disconnect spade lug terminations

Remove mounting screws and transformer

B. Installation

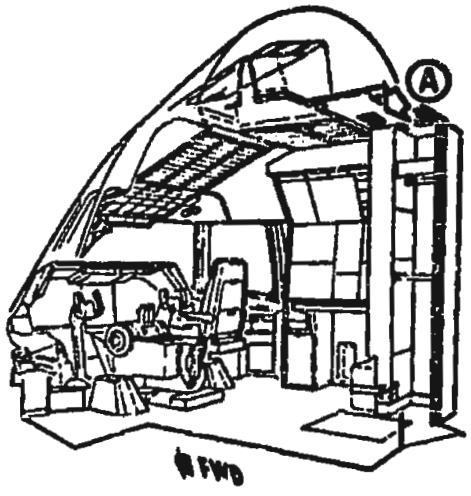
(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Cabin Speaker Transformer Installation

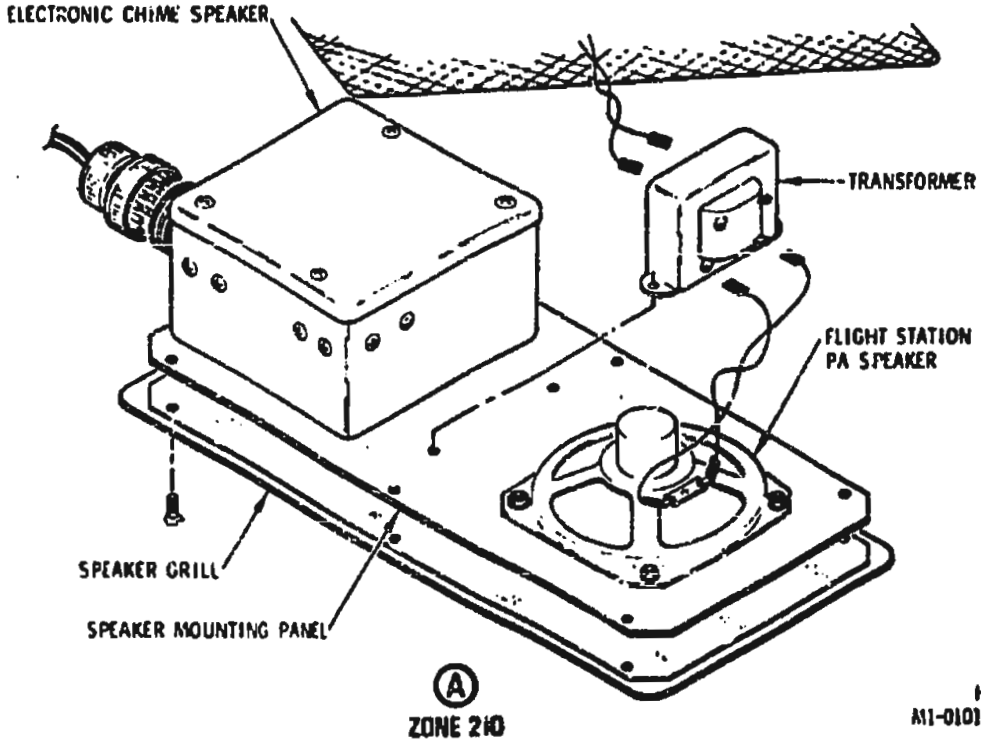
(a) Position transformer with secondary terminals aligned toward speaker and secure with mounting bolts (Ref. Fig. 401).

(b) Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals.

(c) Close ceiling panel (Ref. 25-26-00).

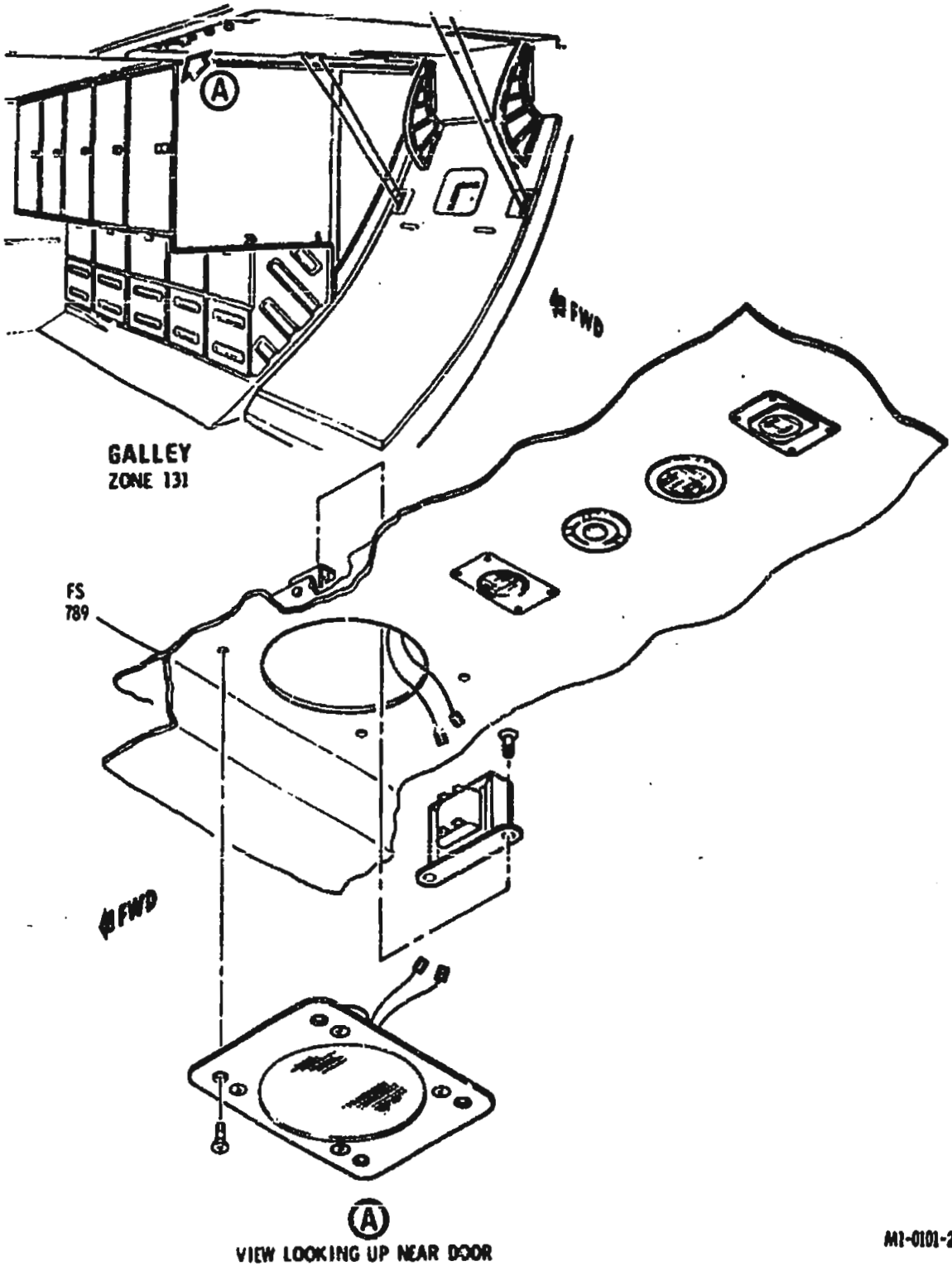


FLIGHT STATION

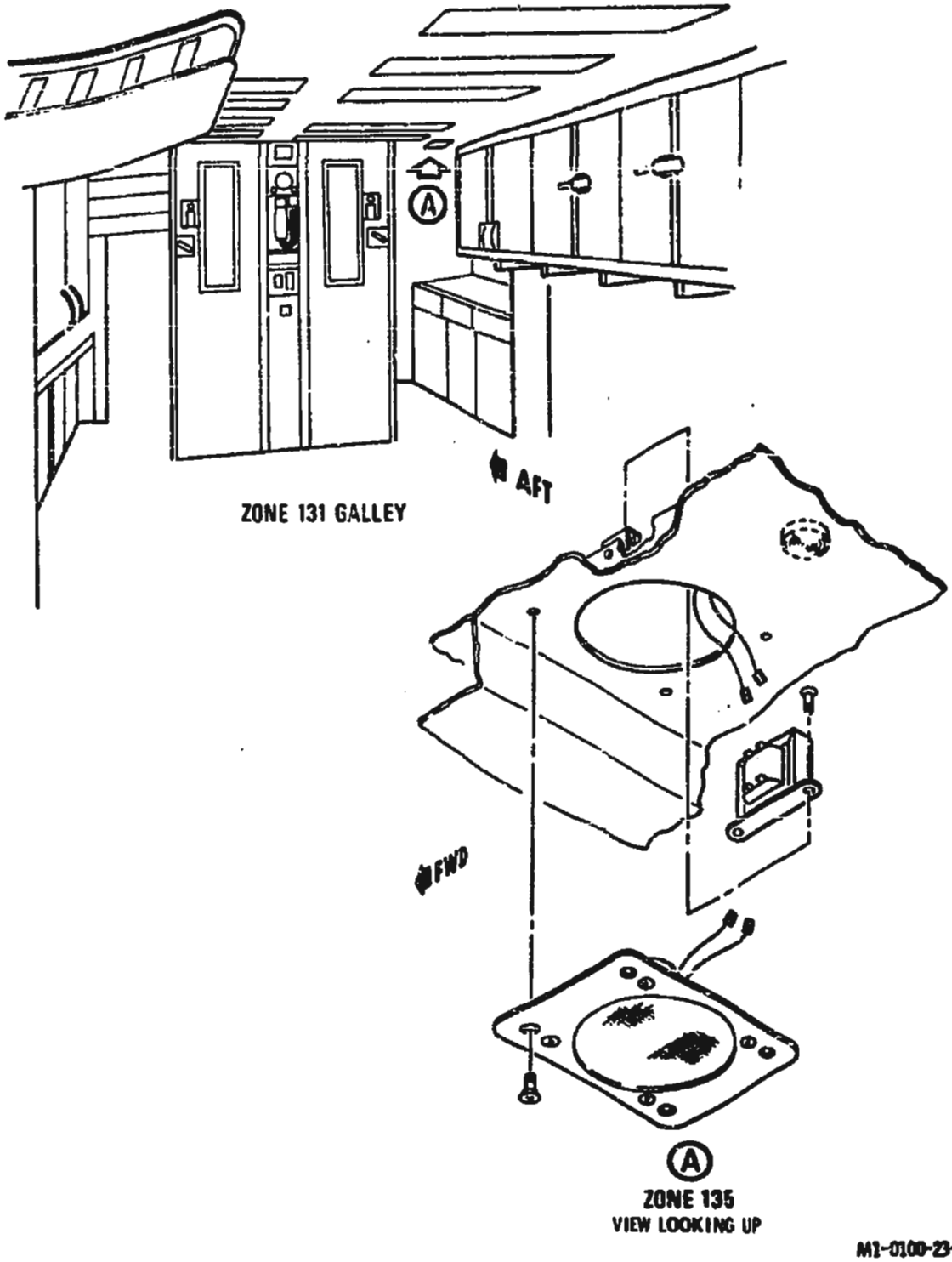


R Flight Station Speaker Transformer - Removal and Installation
R Figure 403

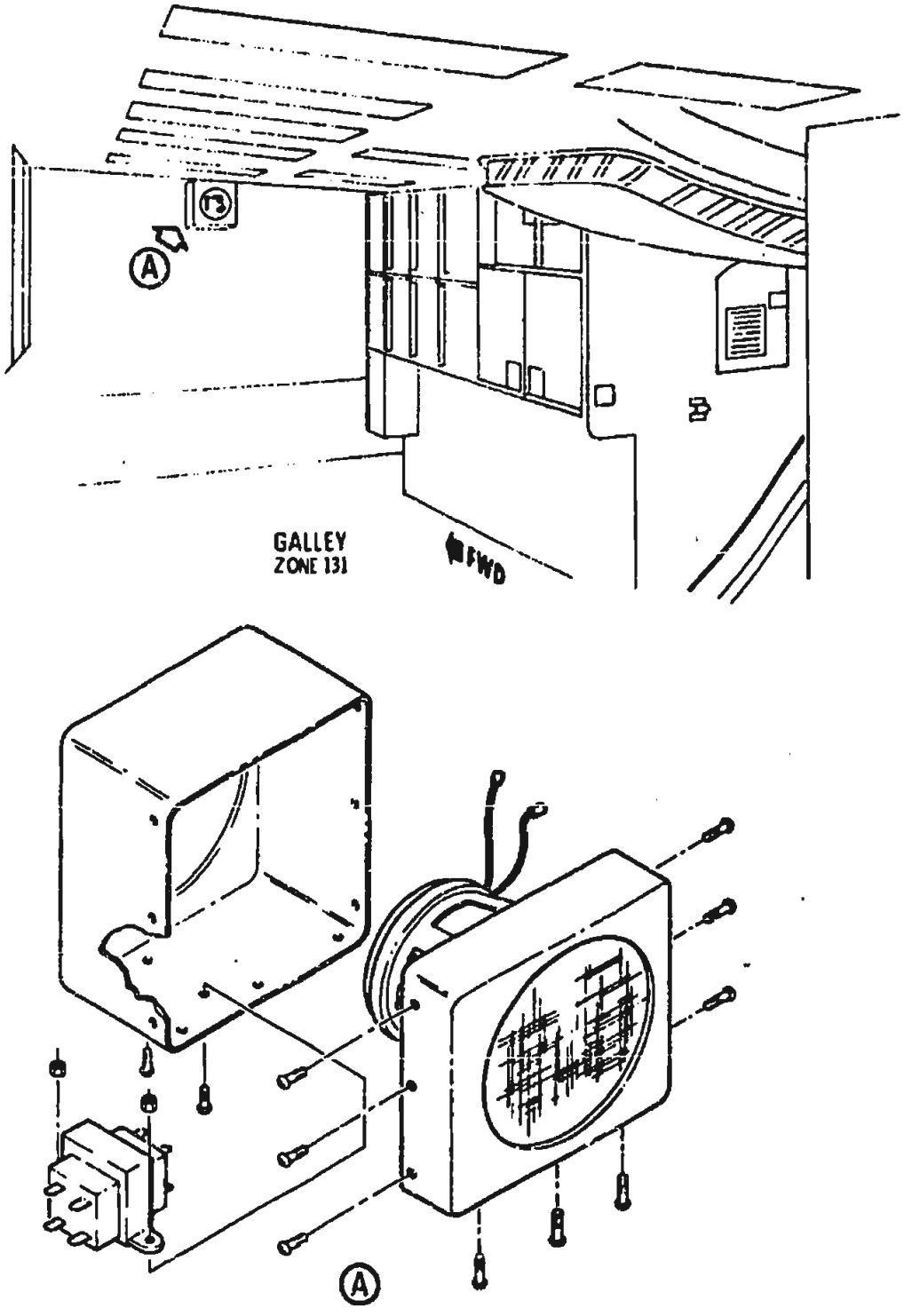
EFFECTIVITY: ALL



Galley PA Speaker Transformer - Removal and Installation
Figure 404 (Sheet 1)



Galley PA Speaker Transformer – Removal and Installation
Figure 404 (Sheet 2)



M1-0100-23-1054

R Galley PA Speaker Transformer - Removal and Installation
R Figure 404 (Sheet 3)

(3) Lavatory Speaker Transformer Installation

(a) Position transformer with secondary terminals aligned toward speaker and secure with mounting bolts (Ref. Fig. 402).

(b) Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals.

(c) Close ceiling panel (Ref. 25-26-00).

(4) Flight Station Speaker Transformer Installation

(a) Position transformer with secondary terminals aligned toward speaker and secure with mounting bolts (Ref. Fig. 403).

(b) Connect electrical connector to electronic chime speaker.

(c) Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals.

(d) Position speaker grille on speaker mounting panel. Place assembly into ceiling mounting frame and secure with mounting screws.

R (5) Galley PA Speaker Transformer Installation

(a) Near Door

Position transformer with secondary terminals aligned toward speaker and secure with mounting screws (Ref. Fig. 404 Sheet 1)

Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals

Place speaker grille mounting panel into ceiling mounting frame and secure with mounting screws

(b) Near Sink

Position transformer with secondary terminals aligned toward speaker and secure with mounting screws (Ref. Fig. 404 Sheet 2)

Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals

Place speaker grille mounting panel into ceiling mounting frame and secure with mounting screws

(c) On Forward Bulkhead

Position transformer with secondary terminals aligned toward speaker and secure with mounting screws (Ref. Fig. 404 Sheet 3)

Remove tags and connect wire spade lug terminals to transformer primary and secondary terminals

Apply cover to speaker enclosure and secure with mounting screws

(6) Remove tags and close circuit breakers opened in Step 2A(1).

(7) Turn on electrical power (Ref. 24-00-00).

(8) In forward electronic service center at rear rack bottom shelf, zone 113, locate PA amplifier No. 1 or No. 2, as applicable.

R NOTE: PA amplifier No. 1 drives first class PA
R speakers, forward lavatories, galley; and if
R selected to first class in flight station,
R flight station PA speaker.

R PA amplifier No. 2 drives coach PA speakers and
R aft lavatory PA speakers.

R NOTE: PA amplifier No. 1 drives right bank of PA
R speakers, flight station, right forward lavatory
R and aft lavatories No. 4 and No. 5, PA speakers.

R PA amplifier No. 2 drives left bank of PA
R speakers, left forward lavatory and aft
R lavatories No. 1, No. 2 and No. 3, PA speakers.

On amplifier front panel, select TEST TONE on test switch.

Verify that speaker test tone is loud and clear at speaker for which transformer was replaced.

(9) Select NORM at amplifier test switch.

(10) Turn off electrical power.

EIGHT-INCH SPEAKER - REMOVAL AND INSTALLATION

1. Reference Procedures

23-31-00	Passenger Address System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
25-26-00	Passenger Compartment Trim and Insulation - Removal and Installation

2. Removal/Installation

A. Removal

(1) Cabin 8-inch PA Speaker

(a) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - No. 1 (A15) and No. 2 (A16).

(b) Lower applicable ceiling panel (Ref. 25-26-00).

(c) Disconnect spade lug terminals from speaker (Ref. Fig. 401).

(d) Remove speaker mounting bolts, then remove speaker.

(2) Galley 8-inch PA Speaker

R (a) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15)

(b) Remove nine screws attaching cover to speaker enclosure (Ref. Fig. 402)

(c) Disconnect spade lug terminals from speaker

(d) Remove mounting screws and speaker

B. Installation

(1) Cabin 8-inch PA Speaker

(a) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(b) Place speaker on mounting with terminals aligned for shortest wire routing from speaker transformer; install mounting bolts (Ref. Fig. 401).

(c) Connect spade lug terminals to speaker terminals.

(d) Close ceiling panel (Ref. 25-26-00).

(2) Galley 8-inch PA Speaker

(a) Verify that the circuit breaker opened in Step 2A(2)(a) is open and tagged.

(b) Place speaker on mounting with terminals aligned for shortest wire routing from speaker transformer; install mounting screws (Ref. Fig. 402).

(c) Connect spade lug terminals.

(d) Apply cover to speaker enclosure and secure with mounting screws.

(3) Remove tags and close circuit breakers opened in Step 2A(1).

(4) Turn on electrical power (Ref. 24-00-00).

(5) In forward electronic service center at rear rack bottom shelf, zone 113, locate PA amplifier No. 1 or No. 2, as applicable.

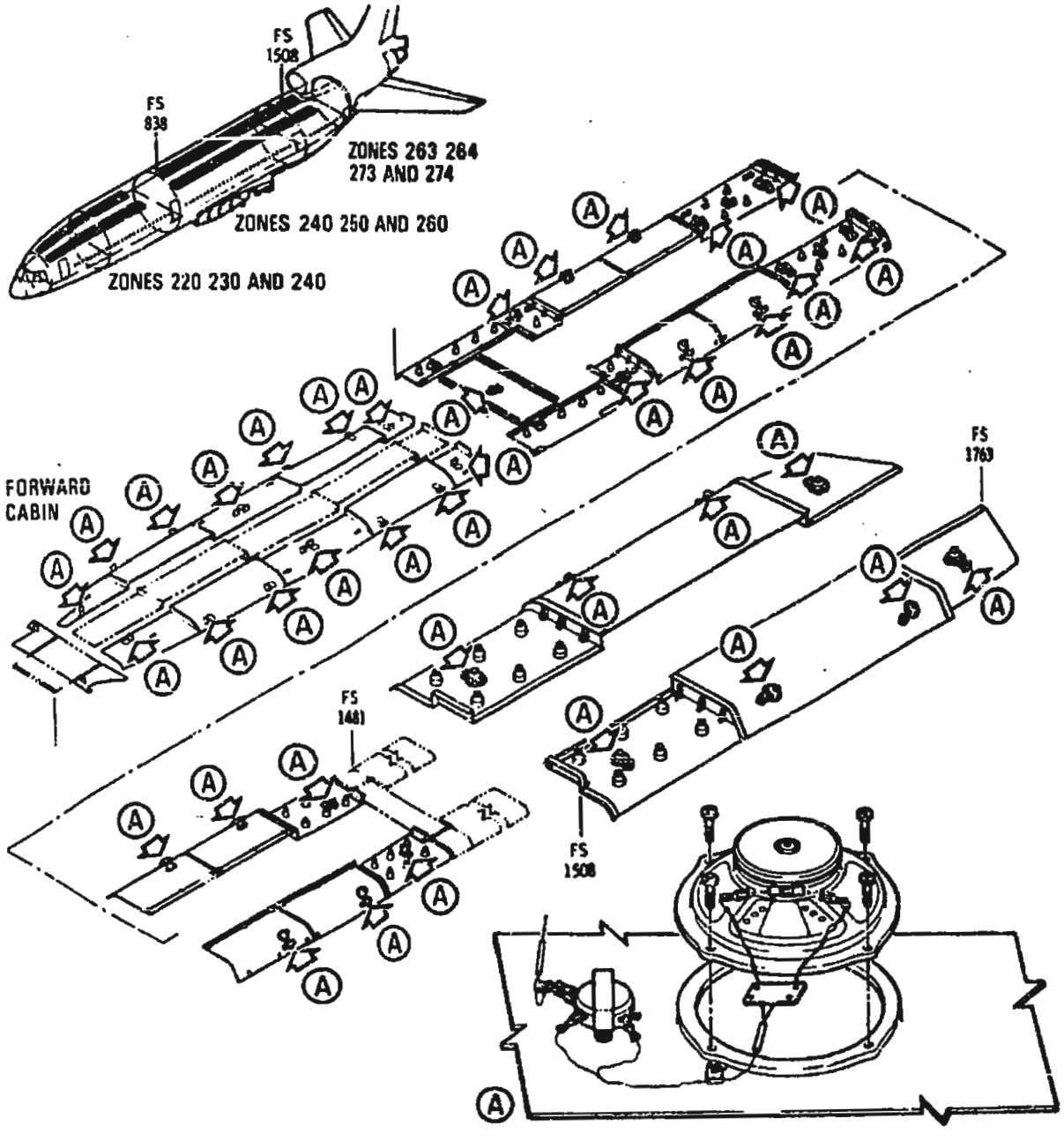
NOTE: PA amplifier No. 1 drives the first class PA speakers, forward lavatories, galley; and if selected to first class in flight station, the flight station PA speaker. PA amplifier No. 2 drives the coach PA speakers and the aft lavatory PA speakers.

On amplifier front panel, select SPKR TEST on test switch.

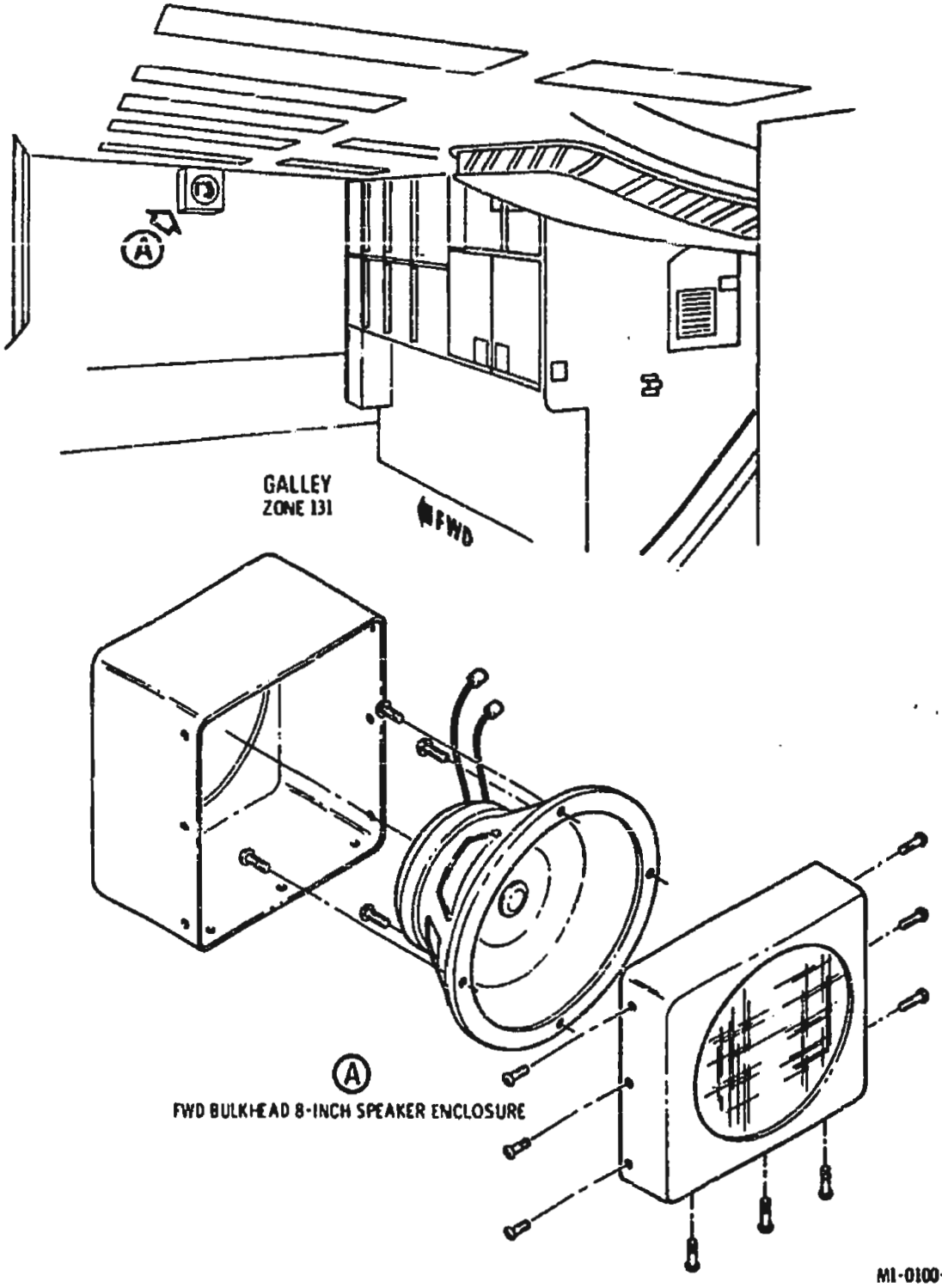
Verify that test tone is loud and clear at speaker which was replaced.

(6) Select OFF at amplifier test switch.

(7) Turn off electrical power.



Cabin Eight-Inch Speaker - Removal and Installation
Figure 401



Galley Eight-Inch Speaker - Removal and Installation
Figure 402

FOUR-INCH SPEAKER - REMOVAL AND INSTALLATION

1. Reference Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-41-00	Cabin and Galley Interphone System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
25-26-00	Passenger Compartment Trim and Insulation - Removal and Installation

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and NO. 2 (A16). R

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - CABIN & GALLEY INTPH (L7 - this breaker is opened only for removal and installation of flight station speaker.)

(2) Cabin 4-inch Speaker

(a) Lower applicable overhead ceiling panel (Ref. 25-26-00).

(b) Tag and disconnect spade lugs from speaker terminals (Ref. Fig. 401).

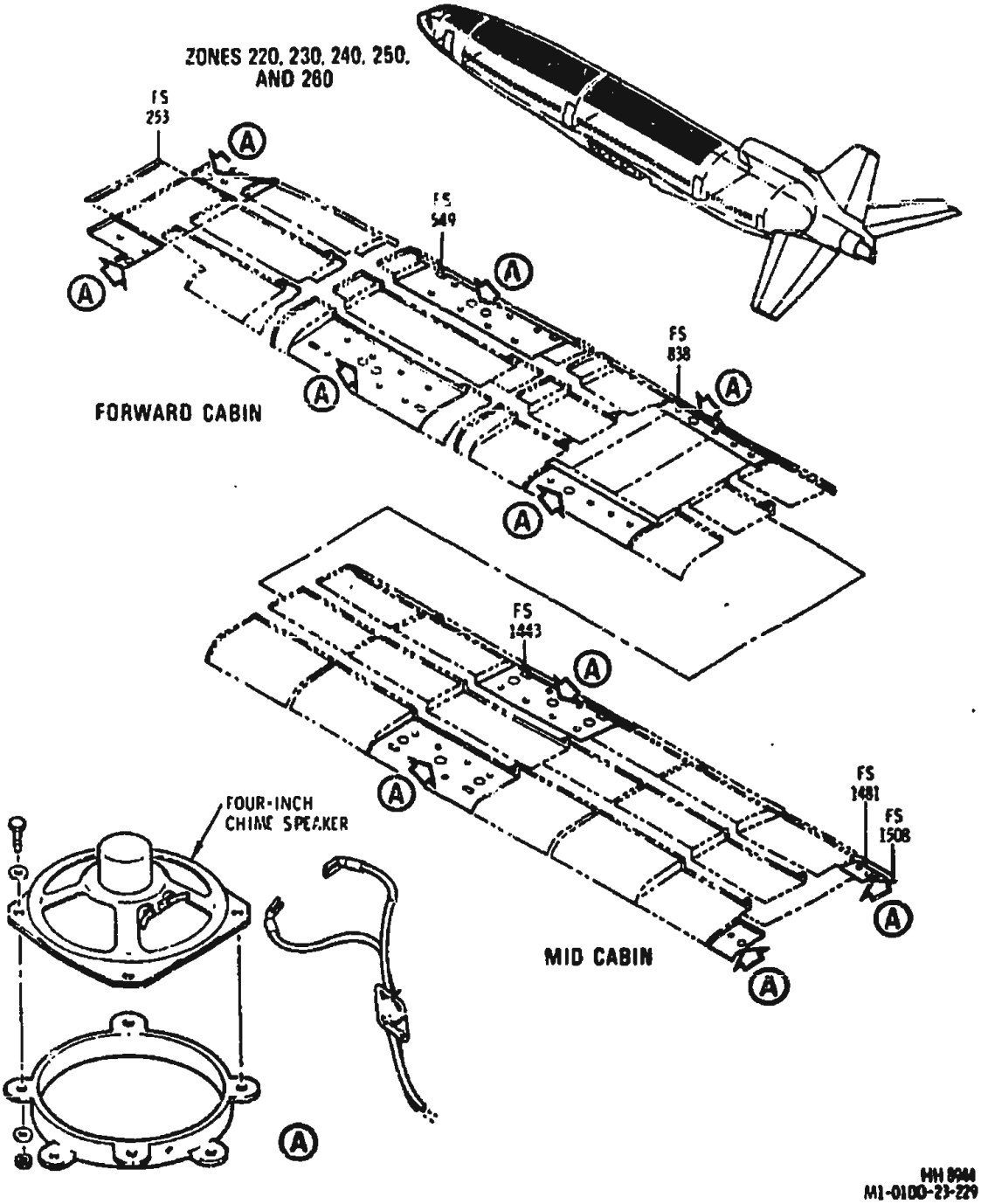
(c) Support speaker and remove mounting screws and speaker.

(3) Lavatory 4-inch Speaker

(a) Lower applicable overhead ceiling panel (Ref. 25-26-00).

(b) Tag and disconnect spade lugs from speaker terminals (Ref. Fig. 402).

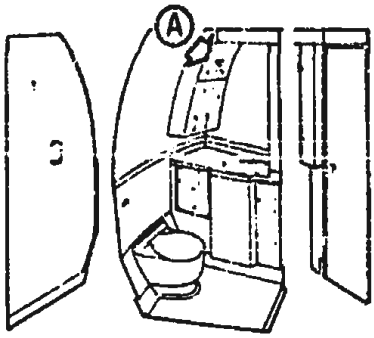
(c) Support speaker and remove mounting screws and speaker.

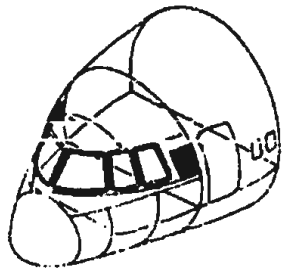


R Cabin 4-inch Speaker - Removal and Installation
R Figure 401

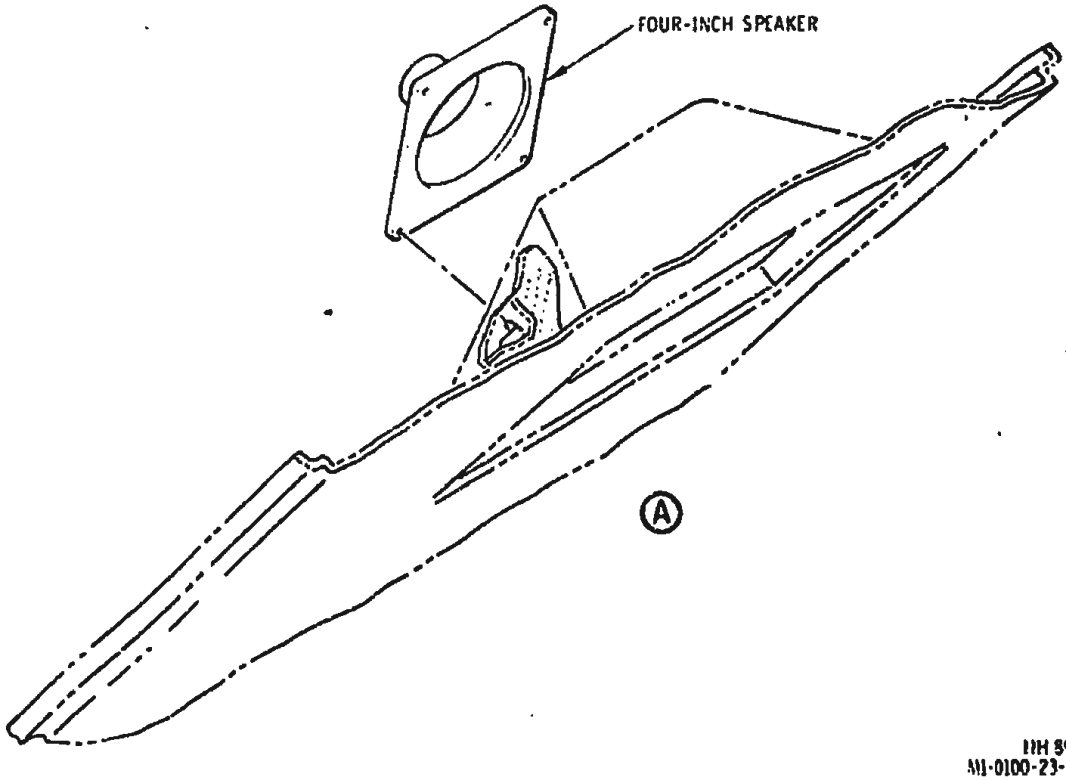
EFFECTIVITY: ALL

0508





ZONE 221 AND 222



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Lavatory 4-Inch Speaker - Removal and Installation
Figure 402

(4) Flight Station 4-inch Speaker

(a) Remove screws supporting speaker grille and mounting panel (Ref. Fig. 403).

(b) Tag and disconnect 4-inch speaker spade lug terminals.

(c) Disconnect connector from electronic chime speaker.

(d) Tag and disconnect transformer primary spade lug terminals.

(e) Tag and disconnect 4-inch speaker spade lug terminals.

(f) Remove speaker mounting screws and lift speaker from mounting panel.

R (5) Galley 4-inch PA Speaker

(a) Near Door

Remove screws supporting speaker grille mounting panel (Ref. Fig. 404 Sheet 1)

Tag and disconnect speaker spade lug terminations

Remove speaker mounting screws and lift speaker from grille mounting panel

(b) Near Sink

Remove screws supporting speaker grille mounting panel (Ref. Fig. 404 Sheet 2)

Tag and disconnect speaker spade lug terminations

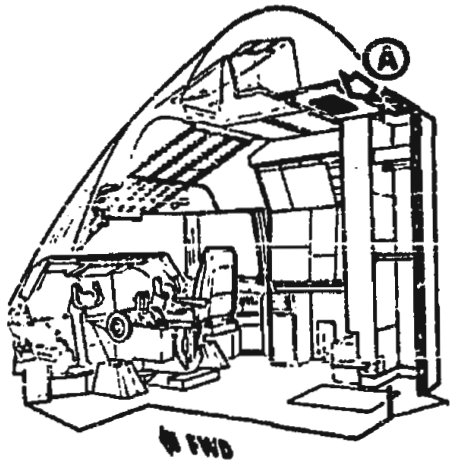
Remove speaker mounting screws and lift speaker from grille mounting panel

B. Installation

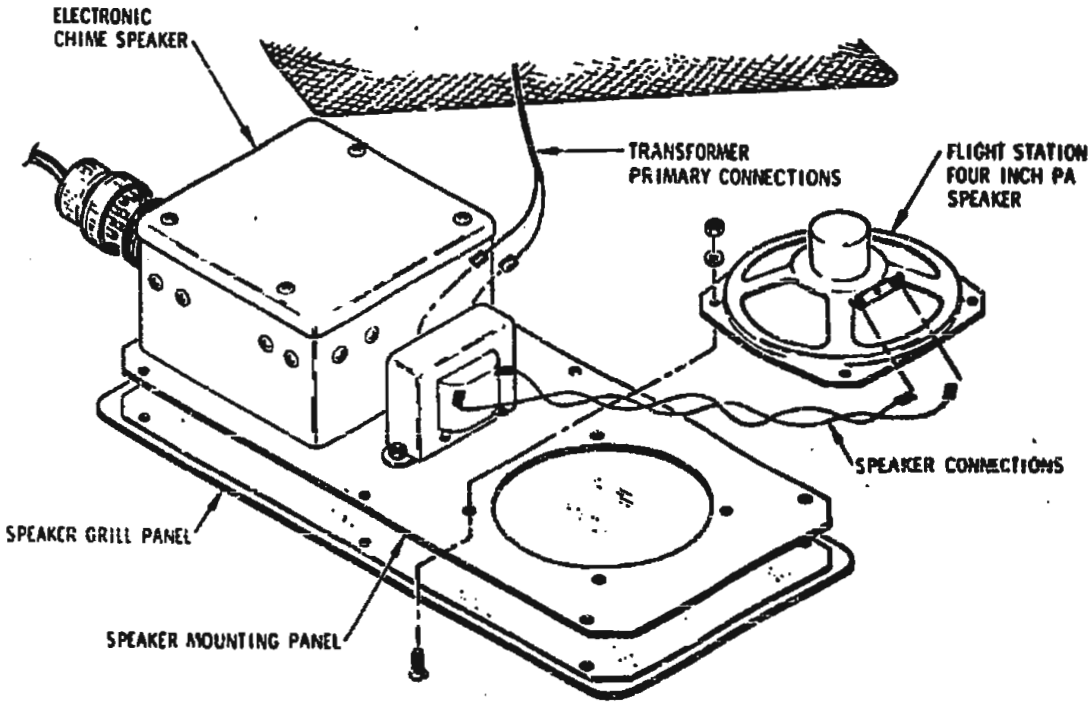
(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Cabin 4-inch Speaker

(a) Place speaker on mount and secure with mounting screws (Ref. Fig. 401).



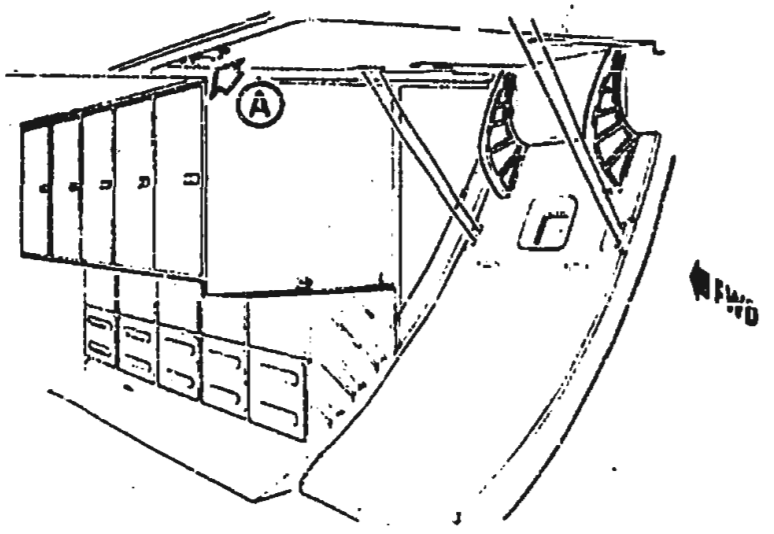
FLIGHT STATION



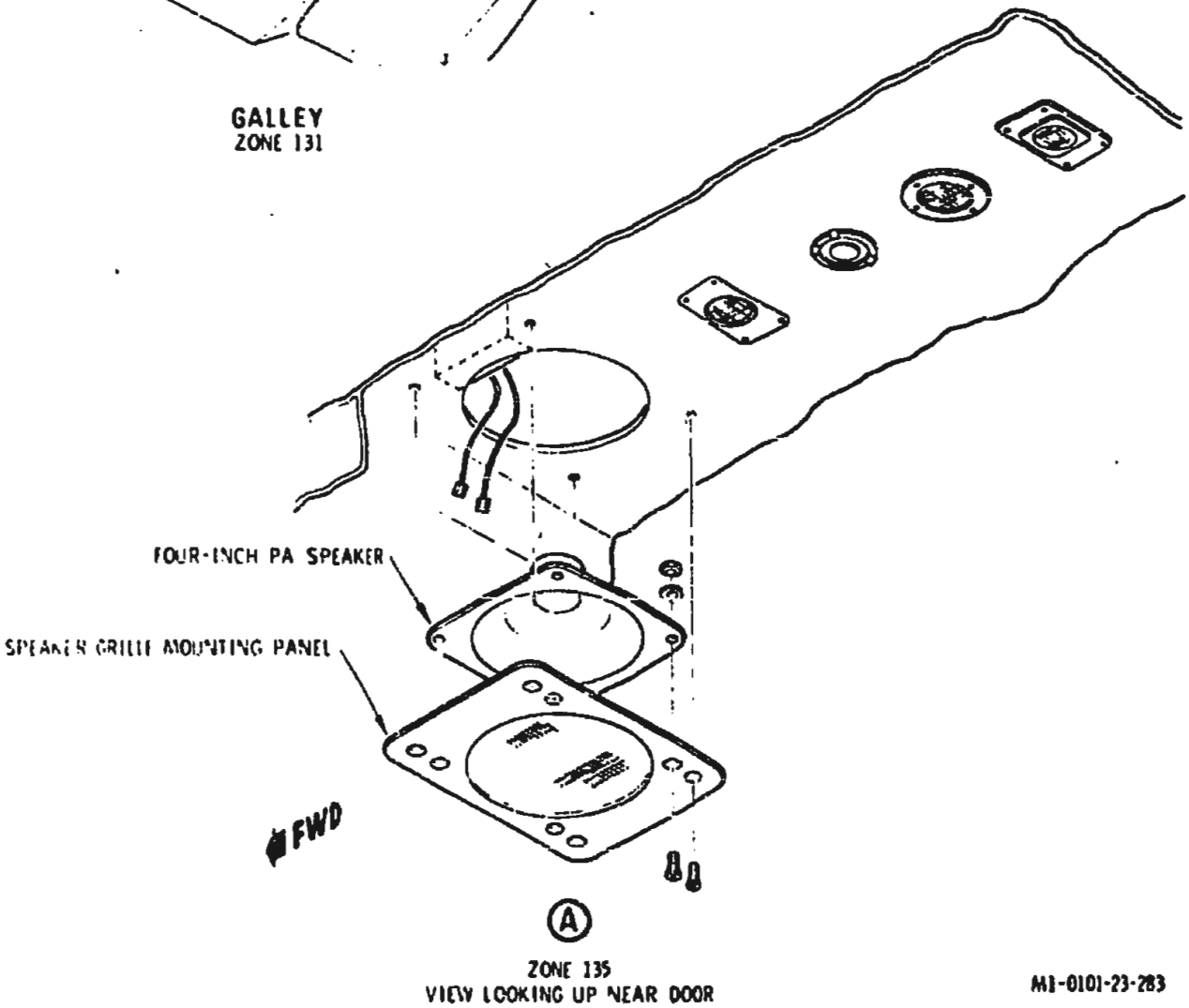
A
ZONE 210

HH 8893
M1-0101-23-230

R Flight Station 4-inch Speaker - Removal and Installation
R Figure 403



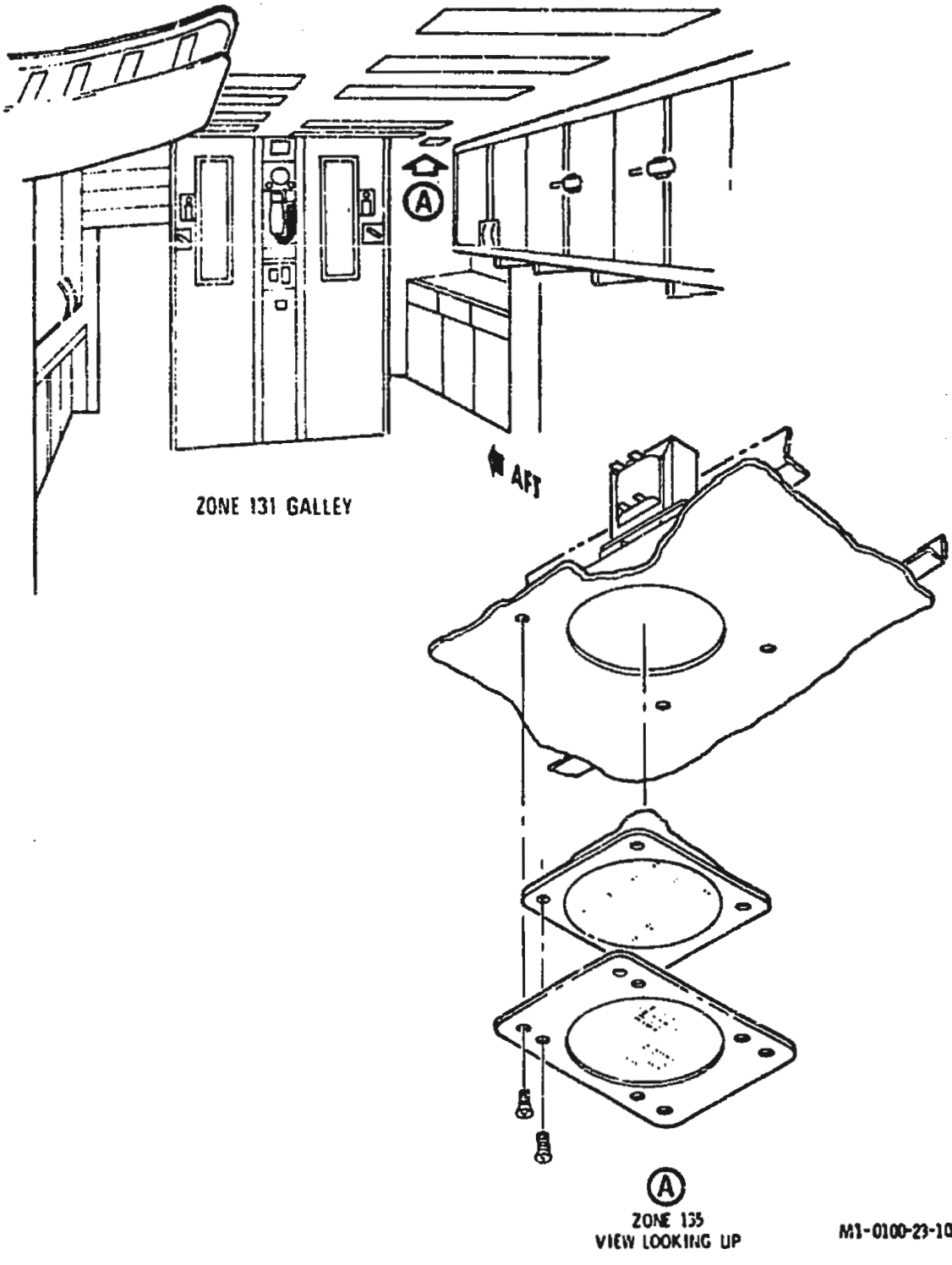
GALLEY
ZONE 131



ZONE 135
VIEW LOOKING UP NEAR DOOR

MI-0101-23-283

R Galley 4-inch PA Speaker - Removal and Installation
R Figure 404 (Sheet 1)



R Galley 4-inch PA Speaker - Removal and Installation
R Figure 404 (Sheet 2)

(b) Remove tags and connect wires to speaker terminals.

(c) Close overhead ceiling panel (Ref. 25-26-00).

(3) Lavatory 4-inch Speaker

(a) Place speaker on mount and secure with mounting screws (Ref. Fig. 402).

(b) Remove tags and connect wires to speaker terminals.

(c) Close overhead ceiling panel (Ref. 25-26-00).

(4) Flight Station 4-inch Speaker

(a) Place speaker on mounting panel and secure with mounting screws (Ref. Fig. 403).

(b) Connect connector to electronic chime speaker.

(c) Remove tags and connect wires to terminals on transformer primary and 4-inch speaker.

(d) Place speaker grille on speaker mounting panel and secure in overhead support frame.

R (5) Galley 4-inch PA Speaker

(a) Near Door

R R Place speaker on speaker grille mounting panel and secure with mounting screws (Ref. Fig. 404 Sheet 1).

R R Remove tags and connect wires to terminals on speaker.

R Place speaker grille mounting panel in overhead support frame and secure with mounting screws.

(b) Near Sink

R R Place speaker on speaker grille mounting panel and secure with mounting screws (Ref. Fig. 404 Sheet 2).

R R Remove tags and connect wires to terminals on speaker.

Place speaker grille mounting panel in overhead support frame and secure with mounting screws.

(6) Remove tags and close circuit breakers opened in Step 2A(1).

(7) Turn on electrical power (Ref. 24-00-00).

(8) If 4-inch speaker replaced was a chime speaker (in passenger compartment; no speaker transformer), proceed as follows (Ref. 23-41-00):

On pilots overhead panel CABIN INTERPHONE panel, zone 210, depress CALL - SIGNAL switch.

Verify that one Hi chime sounds on speaker which was replaced each time CALL - SIGNAL is depressed.

R If 4-inch speaker replaced was a PA speaker (flight
R station, passenger compartment, lavatory, or lower galley), proceed as follows (Ref. 23-31-00):

In forward electronic service center at rear rack, bottom shelf, zone 113, locate PA amplifier No. 1 or No. 2, as applicable.

NOTE: PA amplifier No. 1 drives first class PA speakers, forward lavatories, galley; and if selected to first class in flight station, flight station PA speaker.

PA amplifier No. 2 drives coach PA speakers and aft lavatory PA speakers.

On amplifier front panel, select SPKR TEST on test switch.

Verify that test tone is loud and clear on replaced speaker.

(9) Select NORM at amplifier test switch.

(10) Turn off electrical power (Ref. 24-00-00).

PASSENGER ADDRESS CONTROL PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedure

24-00-00 Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and NO. 2 (A16).

(2) Support PASSENGER ADDRESS CONTROL panel with one hand and release fasteners securing panel to pilots overhead panel, zone 210. Lower panel slowly to prevent damage to adjacent panels.

(3) Disconnect connector on back of panel and remove panel.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Position PASSENGER ADDRESS CONTROL panel at pilots overhead panel.

(3) Connect connector to receptacle on back of panel.

(4) Support panel to prevent damage to adjacent panels. Place panel carefully into position and press firmly while securing fasteners.

(5) Remove tags and close circuit breakers opened in Step 2A(1)

(6) Turn on electrical power (Ref. 24-00-00).

R (7) Key flight station PA microphone, and make test count
R while turning PA panel MONITOR VOLUME control through entire range.

R Verify that panel meter follows voice input level and flight station PA speaker output follows MONITOR VOLUME control smoothly and without control noise.

R Release PA microphone PTT switch and stow microphone.

R (8) Turn off electrical power (Ref. 24-00-00).

MID CABIN PA PANEL - REMOVAL AND INSTALLATION

1. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS PA No. 1 and No. 2.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ORD LTS.

(2) At mid cabin service center, zone 240, remove top and bottom mounting screws from inside forward edge of mid cabin PA panel.

(3) Pull bottom of panel forward and down until clear of mounting.

(4) Remove nuts and wires from panel meter, disconnect electrical connector, and remove panel.

B. Installation

(1) Verify that circuit breakers opened in Step A(1) are open and tagged.

(2) At mid cabin service center, position mid cabin PA panel for mounting and connect electrical connector. Connect wires to correct polarity of meter and secure with nuts.

(3) Set top of panel in mounting and lift up to seat in mounting.

(4) Align mounting holes and install top and bottom mounting screws.

(5) Remove tags and close circuit breakers opened in Step A(1).

R VU METER - REMOVAL AND INSTALLATION

R 1. Referenced Procedures

R	24-00-00	Electrical Power - Maintenance Practices
R R	25-26-15	Forward Attendant Control Panel - Removal and Installation
R R	25-26-16	Aft Attendant Control Panel - Removal and Installation

R 2. Removal/Installation

R A. Forward Left and Aft Left Attendant Positions - Removal

R (1) Remove attendant control panel (Ref. 25-26-15 for R forward panel, or 25-26-16 for aft panel).

R (2) Remove nuts holding wires on meter terminal posts, R remove wires, and replace nuts on terminal posts.

R (3) Remove screws holding meter to panel, and remove meter. R Retain screws for installation.

R B. Forward Left and Aft Left Attendant Positions - Installation

R (1) Slide meter into slot in attendant panel and secure R with screws.

R (2) Remove nuts from meter terminal posts, slide wires onto R posts, and secure with nuts.

R (3) Install attendant control panel (Ref. 25-26-15 for R forward panel, or 25-26-16 for aft panel).

R (4) Turn on electrical power (Ref. 24-00-00).

R (5) On pilots overhead circuit breaker panel CB1, zone 210, R verify that circuit breakers ESSENTIAL COMMUNICATIONS R BUS - PA - NO. 1 (A15) and NO. 2 (A16) are closed.

R (6) Depress PA microphone press-to-talk switch and speak R into microphone.

R Verify that VU meter deflection follows microphone R voice input.

R (7) Turn off electrical power (Ref. 24-00-00).

R C. Mid Cabin Service Center - Removal

R (1) On pilots overhead circuit breaker panel CB1, zone 210, R open and tag circuit breakers ESSENTIAL COMMUNICATIONS R BUS - PA - NO. 1 (A15) and NO. 2 (A16).

R WARNING: TURN LIFT MASTER KEY SWITCH OFF AND REMOVE R KEY BEFORE ENTERING LIFT ENCLOSURE.

R DO NOT RUN EITHER LIFT WITH PERSONNEL IN ANY R PART OF LIFT ENCLOSURE.

R STAND ON TOP OF LIFT CAGE WHEN WORKING IN R LIFT ENCLOSURE.

R (2) Lower either left or right lift cage, turn lift master R key switch OFF, and remove key.

R Release lift door latch with screwdriver and open door.

R (3) In lift enclosure, locate rear of VU meter, and remove R nuts holding wires on meter terminal posts. Remove R wires and replace nuts on terminal posts.

R (4) Remove nuts holding meter to panel, remove meter, and R replace nuts.

R (5) Insert key in lift master switch and turn to BOTH.

R D. Mid Cabin Service Center - Installation

R (1) Verify that circuit breakers opened in Step 2C(1) are R open and tagged.

R WARNING: TURN LIFT MASTER KEY SWITCH OFF AND REMOVE R KEY BEFORE ENTERING LIFT ENCLOSURE.

R DO NOT RUN EITHER LIFT WITH PERSONNEL IN ANY R PART OF LIFT ENCLOSURE.

R STAND ON TOP OF LIFT CAGE WHEN WORKING IN R LIFT ENCLOSURE.

R (2) Lower either left or right lift cage, turn lift master R key switch OFF, and remove key.

R Release lift door latch with screwdriver and open door.

R (3) Remove nuts from meter mounting screws, slide meter R onto screws and against panel, and secure with nuts.

R (4) Remove nuts from meter terminal posts, slide wires onto
R posts, and secure with nuts.

R (5) Turn on electrical power (Ref. 24-00-00).

R (6) Remove tags and close circuit breakers opened in Step
R 2C(1).

R (7) Depress PA microphone press-to-talk switch and speak
R into microphone.

R Verify that VU meter deflection follows microphone
R voice input.

R (8) Turn off electrical power (Ref. 24-00-00).

R Insert key in lift master switch and turn to BOTH,
R close lift door.

PASSENGER ENTERTAINMENT (AUDIO) AND SERVICE SYSTEMS DESCRIPTION AND OPERATION

1. General

The L-1011 has two multiplex systems, the passenger entertainment (audio) system (PES) and the passenger service system (PSS). Except for a few commonly shared components, they are independent of each other and will be covered separately in this section. Figure 1 shows the common components used by each system, the PSS components are shown to the left of the dash line and the PES to the right.

The PSS compartment controllers are normally used by the passenger service system, but are also used by both systems during test modes. PSS overhead decoders activate the passenger reading lights, cool air valves (optional on some aircraft), and attendant call lights. The passenger service modules (PSM) (Ref. 25-22-00) contain the reading light, cool air valves (Ref. 21-23-00), etc. Seat electronic units (SEU) are common use, dual function components that encode the PSS requests and demultiplex PES audio. The passenger control units (PCU) (Ref. 25-21-00) contain the controls for both systems (PSS/PES) and audio headset jacks. The multiplexer PSS/PES test panel and the central power supply are also common components used by both systems.

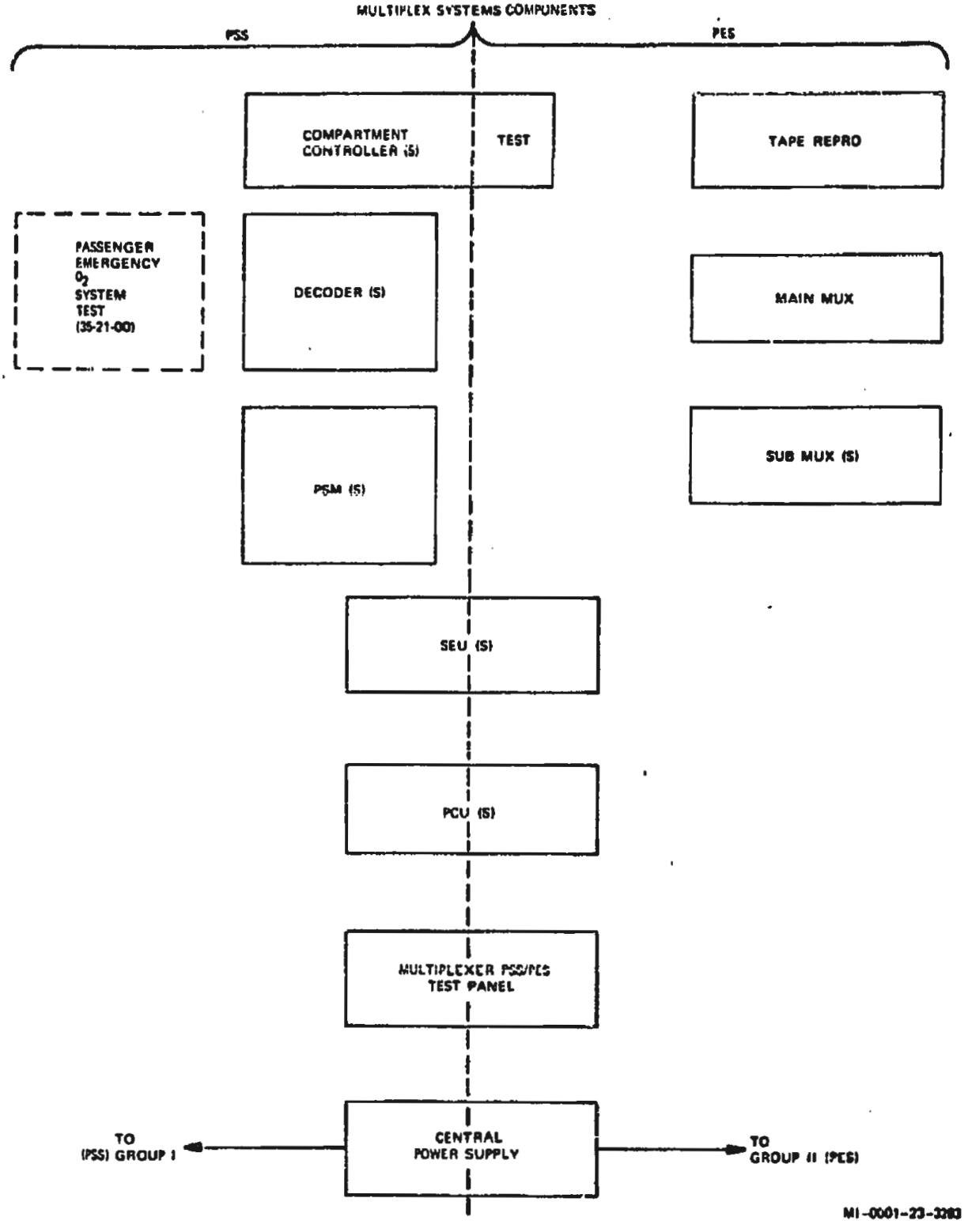
Components used exclusively by the PES are the tape reproducer (23-35-01), the main multiplexer, and submultiplexers.

2. Passenger Service System (PSS)

A. Description (Ref. Fig. 2)

The passenger service system (PSS) is a digital, time-division multiplexing system that provides the passenger with reading lights, attendant call and cooling air (optional) (21-23-00) control for his seat. In addition, the system also has built-in-test capability for each of the system functions.

R The L-1011 uses a multiplex type system for a number of reasons. First, due to the eight-foot high passenger compartment ceiling, direct operated controls are not practical. The multiplexing approach also eliminates the need for wiring cables used in conventional control systems. Since each seat contains its own electronics and control, and are interconnected by quick-disconnect type cables; changes in seat configurations can be made more easily. An



R Multiplex Systems (PES/PSS) Components
R Figure 1

attendant call button is located in each passenger control unit (Ref. 25-21-00) and in each lavatory. Actuating a call button illuminates a seat row or lavatory advisory light, and color-coded ceiling-mounted area advisory lights located at the intersection of each longitudinal aisle and each cross aisle. A chime also sounds in the area of the advisory light illumination. Attendant calls from passenger seats normally accessible from the left aisle will
R illuminate only the the left ceiling-mounted area advisory lights and the same for the right-aisle seats.

The forward advisory lights and chimes operate for the first-class section only. The mid and aft cabin cross-aisle advisory lights and chimes operate in the coach compartment only. The call system is reset by pushing the activated call button which extinguishes the lights.

On aircraft 032-999,
the lavatory attendant call function does not use the PSS multiplex, but is part of the Passenger Call System functions, refer to 33-26-00 for description and operation of the lavatory attendant call lights functions.

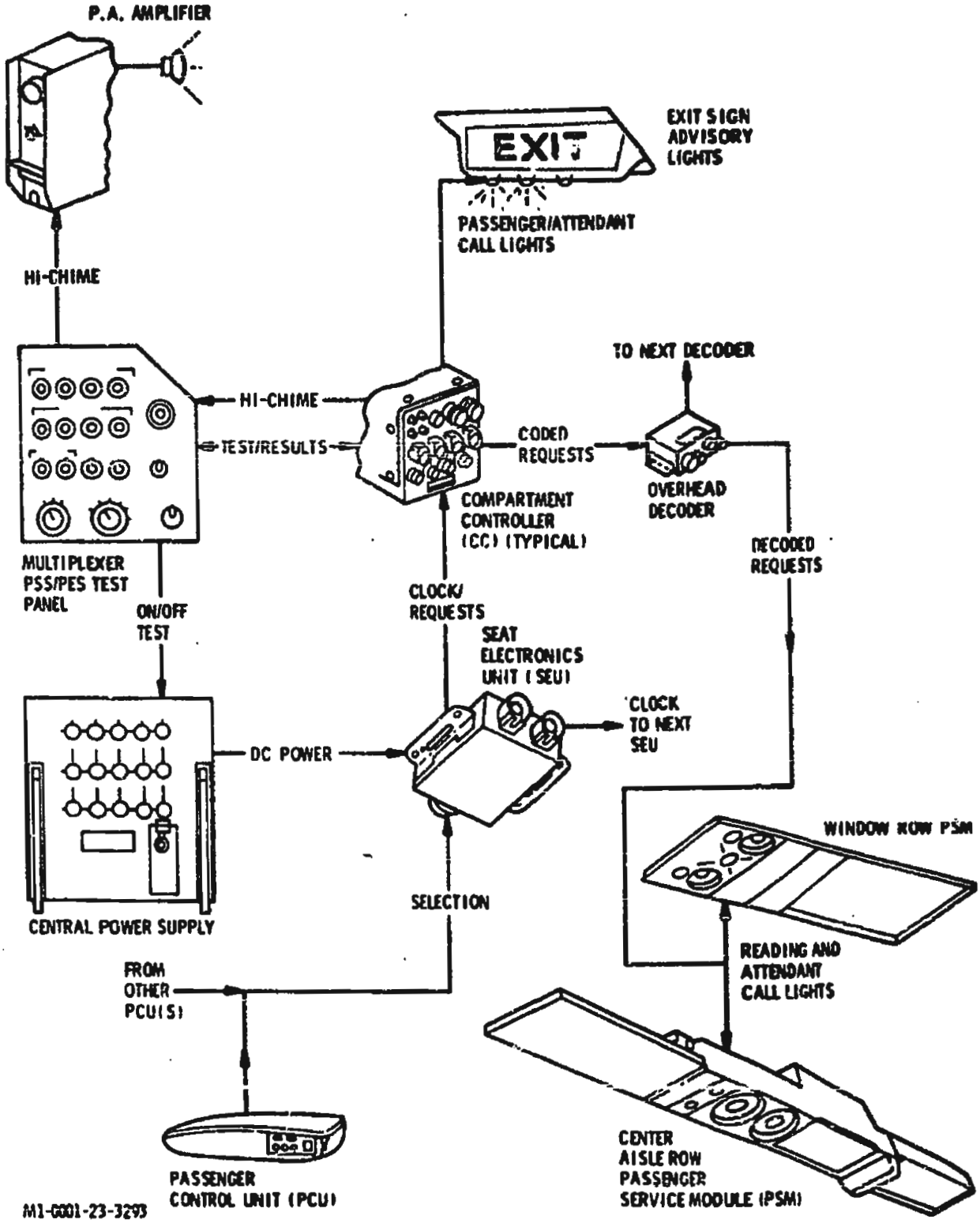
The PSS consists of the following components (Ref. Fig. 3):

(1) Two/three-seat electronic units (SEU) located in the passenger compartment under each seat group, (one for each seat group); the quantity of seat electronic units will vary with the aircraft seat arrangement.

(2) On aircraft 001-031,
seven lavatory seat electronic units (SEU) located above the passenger compartment ceiling; the left and right forward lavatory units are located above ceiling panel in zone 230, and the aft lavatory units are located above ceiling panel in zone 273.

(3) Four compartment controllers (No. 1, No. 2, No. 3, and No. 4) located above the passenger compartment ceiling; No. 1 compartment controller is located above ceiling panel in zone 225, No. 2 compartment controller is located above ceiling panel in zone 243, No. 3 compartment controller is located above ceiling panel in zone 260, and No. 4 compartment controller is located above ceiling panel in zone 270.

(4) Decoders are located near the overhead passenger service modules (one above each seat group) (Ref. 25-22-00), zone 200. The quantity of decoders will
R vary with passenger seating arrangement. Where arrangement requires no decoder, a decoder bypass assembly may be installed in its place.



R PSS Intercomponent Data Flow Diagram
R Figure 2

(5) MULTIPLEXER PSS/PES TEST panel located on the bulkhead forward of the R1 door, outboard of the forward right attendant seat.

(6) Central power supply located in the mid electrical service center (MESC), zone 137.

(7) Passenger control units (PCU) located in the passenger seat arms (one per seat). The units are part of the passenger compartment seat; the quantity will vary according to seating arrangement (Ref. 25-21-00).

(8) Passenger Compartment Service Modules (PSM) (Ref. 25-22-00) located over each seat-group; center aisle and outboard (window), contain reading lights, attendant call light (blue) and cool air outlet valves (optional on some aircraft).

(9) Eight blue attendant advisory lights (Ref. 33-26-00), one each on the bottom of the EXIT signs by the L1, R1, L2, R2, L3, R3, L4, and R4 passenger compartment doors, zones 223, 224, 241, 242, 261, 262, 271, and 272 respectively.

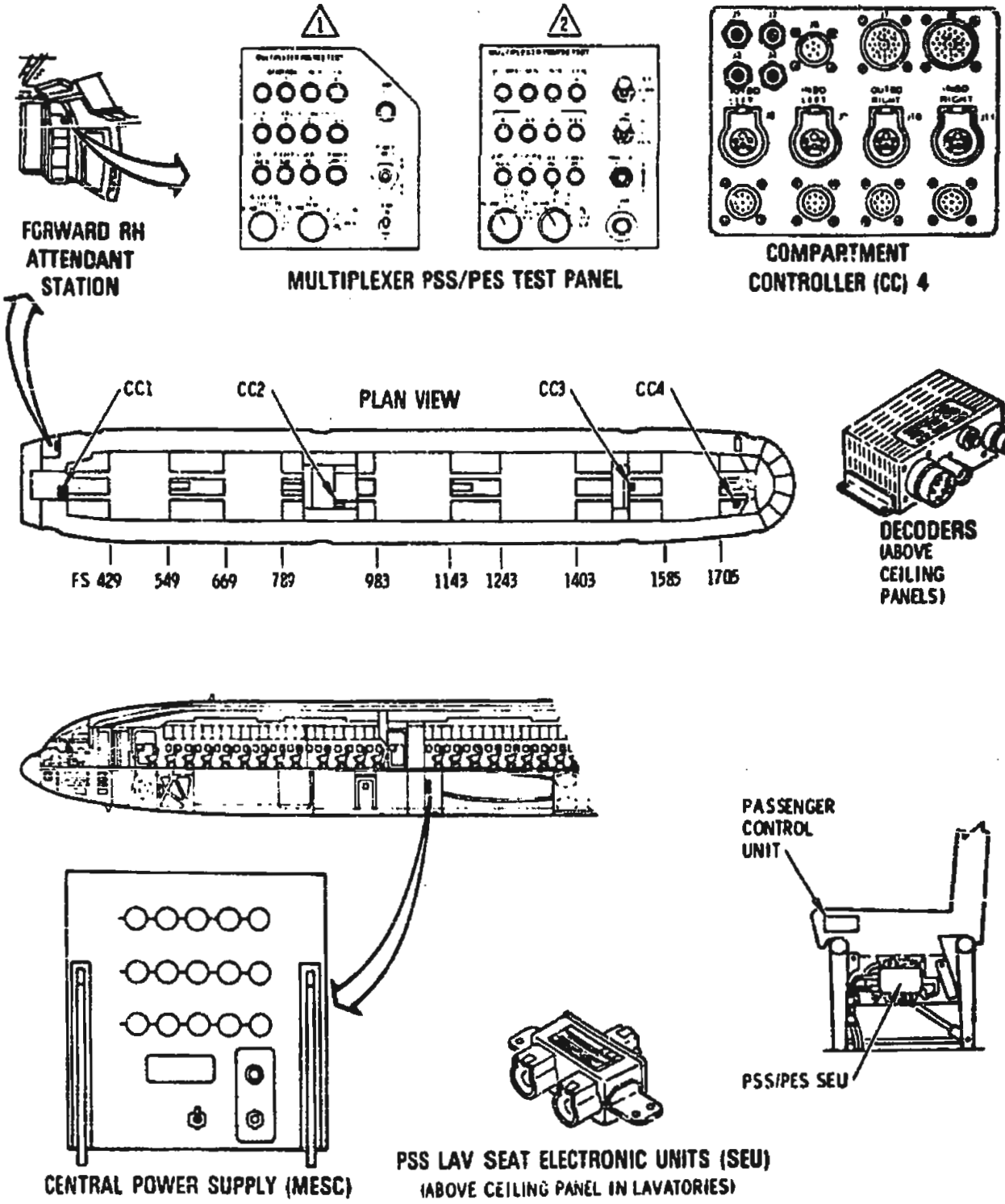
R (10) On aircraft 001-031,
R four amber lavatory attendant advisory call lights
R (Ref. 33-26-00), one each on the bottom of the EXIT
R signs by the L1, R1, L4, and R4 passenger compartment
R doors, zones 223, 224, 271, and 272 respectively.

R On aircraft 032-999,
R the four amber lavatory attendant advisory call lights
R are components of the Passenger Call System (Ref.
R 33-26-00).

B. PSS Operation

(1) System Power The central power supply provides the DC operating voltages to the SEUs, CCs and the decoders. The power supply unit has a self and remote test feature, provided by a switch on the front of the unit and also a switch located on the MULTIPLEXER PSS/PES TEST panel.

(2) PSS Service Zones and Columns - (Ref. Fig. 4) for purpose of PSS operation, the aircraft is divided into two communities. Each community is serviced by two compartment controllers (CC). Each community is further divided into four service zones. The overhead decoders at the end-of-zone (EOZ) are electronically coded (EOZ jumper) to inform the CC which zone the CC is presently interrogating. This EOZ data is used by



NOTE

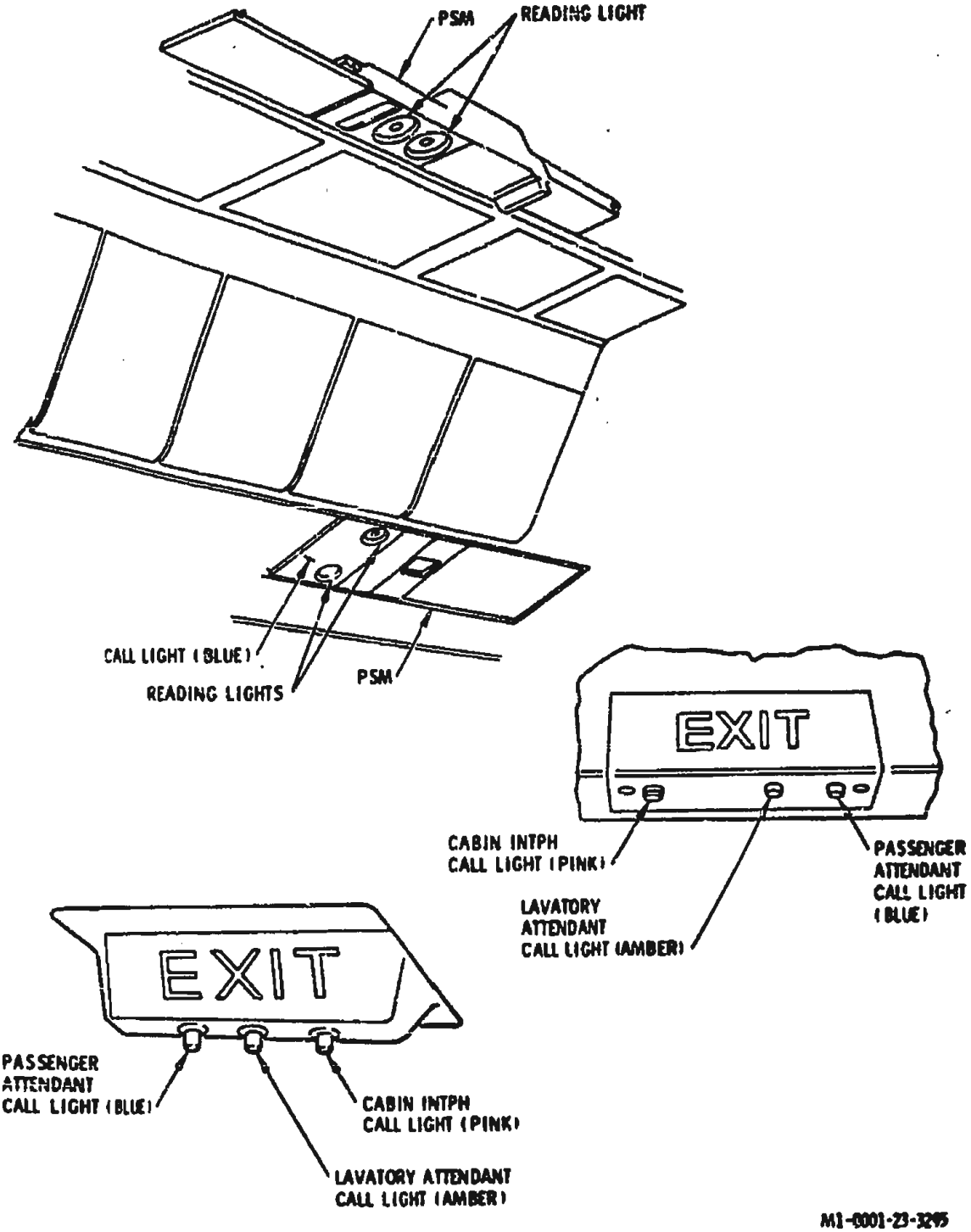
1. AIRCRAFT 001-031
2. AIRCRAFT 032-999

MI-0000-23-3647

R
R

PSS Component Location
Figure 3 (Sheet 1)

EFFECTIVITY: ALL



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R
R PSS Component Location
Figure 3 (Sheet 2)

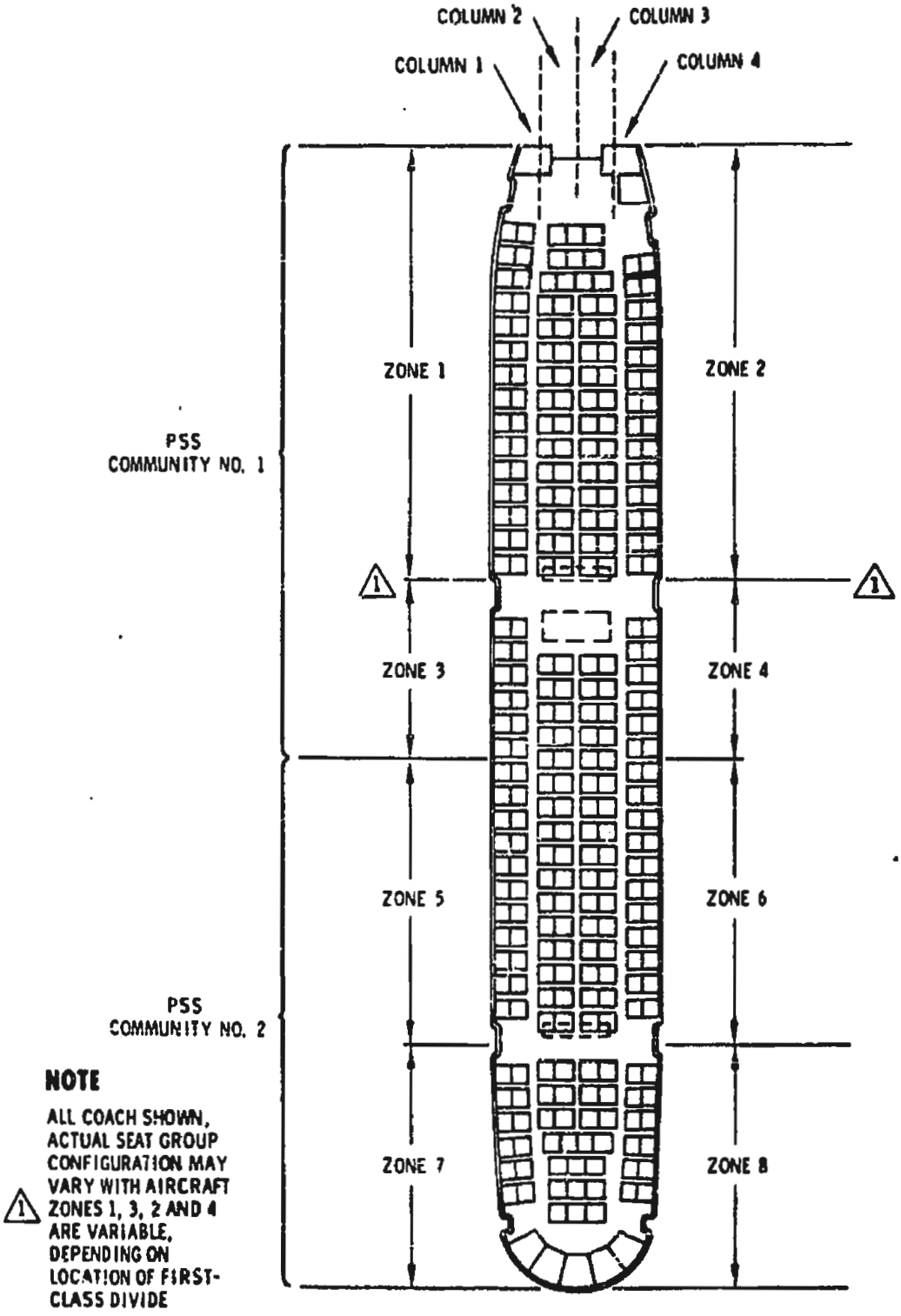
R EFFECTIVITY: ALL
R
001B

R the CC for lighting the proper exit advisory call light, sounding the proper chime and operating the MULTIPLEXER PSS/PES TEST panel.

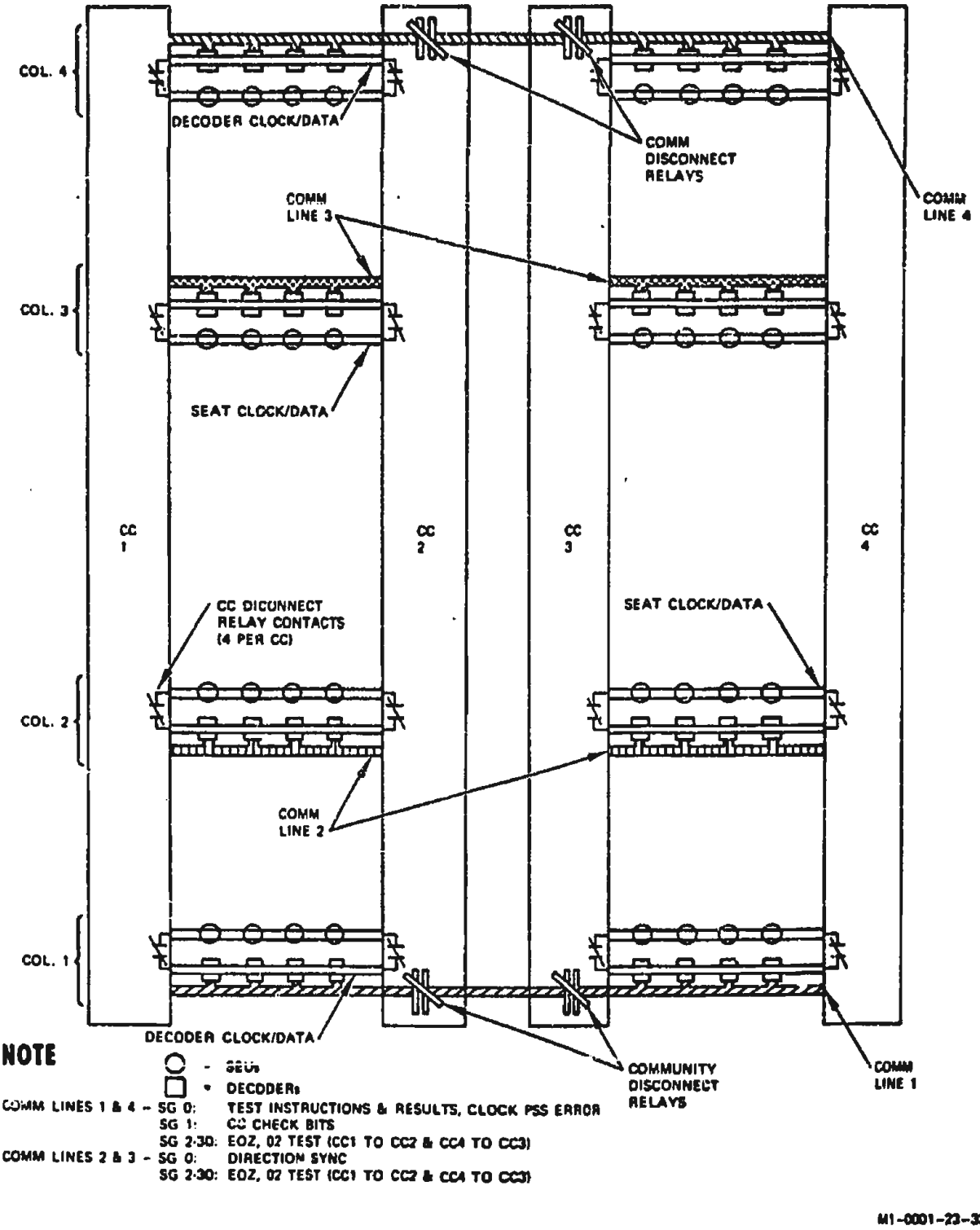
(3) PSS Intrasystem Communication Lines - (Ref. Fig. 5) the PSS multiplex system uses wires referred to as Communication (Comm) lines. They are used to transmit data between compartment controllers (CC) and also from overhead decoders to CCs. This data is essential to both the normal and test functions of the passenger service system.

The system contains four Comm lines, one for each column run. The lines run from one CC through the overhead decoders in its column to the next CC. Comm lines 1 and 4 are used for community-to-community communication, and Comm lines 2 and 3 are used to transmit data between CCs within a community.

The Comm lines convey data from the decoders to the CCs during normal system operation, namely (1) End-of-Zone (EOZ), (2) LAV decoder and (3) Attendant oxygen positions. The EOZ data is used by the CC to determine which exit sign advisory light to illuminate. CC1 is continuously running self-test on itself and also receiving check bits from the other three CCs. System faults in a particular service zone are reported to CC1 on Comm lines 1 and 4. The four seat-group columns in each community are terminated at both ends by compartment controllers. In community 1, compartment controller No. 1 (CC1) is the forward termination, and CC2 is the aft termination. In community 2, CC3 is the forward termination, and CC4 is the aft termination. The compartment controllers are connected together by communication circuits (CC Comm lines). There is one CC Comm line for each column. CC Comm lines 1 and 4 connect all four compartment controllers together. CC Comm lines 2 and 3 connect CC1 and CC2 together in community 1, and connect CC3 and CC4 together in community 2. Seat-group-times SG0 and SG1 are used by the compartment controllers to communicate with each other over the CC Comm lines. During SG0, the compartment controllers transmit and receive data pulses for direction synchronization, test mode commands, and test results. During SG1, the compartment controllers transmit and receive check bits (data pulses) for self-test. One compartment controller in each community transmits clock pulses to the seats and decoders during each frame. The direction of operation in community 1 is controlled by CC1 and in community 2 by CC4.



PSS Zones/Columns Layout
Figure 4



NOTE

○ - SEUs

□ • DECODERs

COMM LINES 1 & 4 – SG 0: TEST INSTRUCTIONS & RESULTS, CLOCK PSS ERROR
SG 1: CC CHECK BITS
SG 2-30: EOZ, 02 TEST (CC1 TO CC2 & CC4 TO CC3)

COMM LINES 2 & 3 – SG 0: DIRECTION SYNC
SG 2-30: EOZ, 02 TEST (CC1 TO CC2 & CC4 TO CC3)

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PSS Intrasystem Comm Lines
Figure 5

R
R
0018 EFFECTIVITY: ALL

(4) PSS System Operation - (Ref. Fig. 6) the passenger service system (PSS) provides controls (switches) for operating the service devices (lights, valves, etc.) in the passenger service module (PSM). Since it is not necessary that each switch be continuously connected to the light/valve it is to control, a delay of up to two seconds between switch actuation and light/air valve activation is acceptable in this type control system. A method of connecting each switch to the corresponding light/air valve in a time-division sequence allows several device control functions to time-share a single control circuit between the passenger seat and the overhead PSM.

In order to have a time-share circuit, there must be a functional sequencing (encoding) device at the passenger seat and an interpreting (decoding) device at the PSM. In this case, the encoding device is the seat electronics unit (SEU) and the decoding device is the overhead decoder. In normal operation, the SEU interrogates each passenger control unit switch (reading light/attendant call) in sequence, and transmits data pulses (bits), which represent the selected switch, to the decoder. The decoder translates the data pulse train and provides command signals to the PSM to activate light(s)/valve(s) selected by the PCU. The decoder command signal circuits remain latched until new switch selection data pulse train is received from the SEU. Each SEU/Decoder pair services one seat group. A seat group can consist of one, two or three seats, depending on location.

The time-sharing functions of the SEU and the decoder interrogate a seat group of PCU switches in 10.4-milliseconds. This seat group interrogation occurs about twice every second, thereby using about 2-percent of the time available. This short-time-sharing interrogation allows several seat-groups (a column) to time-share a single circuit.

In order to have a time-share data circuit, the system data pulses must be synchronized so that each data pulse represents the same light/air valve circuit to both the SEU and its decoder. This synchronization function is provided by the compartment controller (CC) generating clock pulses and transmitting them on the seat and decoder clock/data line to each SEU and decoder.

The seat groups are cable-connected in series, SEU to SEU, along each seat-group column in each community. A column can also include lavatory and/or lounge/bar

seat-groups. The overhead decoders are also connected in series along each seat-group column.

The passenger service system monitors the state of all passenger reading light, attendant call, and individual air outlet switches at each seat by sampling data, from seat-group-to-seat-group, simultaneously along all four columns in both communities. Seat-group-times SG2-SG30 are used to interrogate the seat groups. At the beginning of SG2 (SG2•B0), the transmitting compartment controller in each community starts transmitting clock pulses on the seat and decoder clock/data lines for all four columns. The seat groups along each column are interrogated in sequence, first in one direction (one frame), and then in the opposite direction (next frame). At the end of SG30 (SG30•B15), the compartment controllers stop transmitting clock pulses on the seat/decoder clock/data lines for three seat-group (SG) times (SG31-SG2). The absence of clock (and data) pulses on the clock/data lines for three seat-group-times (SG) is interpreted by the seat electronic units and decoders as seat-group frame synchronization. Seat-group frame synchronization resets the seat electronic units and the decoders to the ready state.

When the compartment controller starts transmitting clock pulses on the clock/data lines, the SEU and the decoder nearest to the compartment controller in each column detect the first clock pulse and switch to the active state. When they are in the ready or active state, the clock/data lines are terminated in the SEU and decoder, so that the remaining SEU and decoders along the column do not receive clock pulses, and therefore remain in the ready state.

The SEU counts the clock pulses, and interrogates each of its internal logic circuits at the appropriate time to determine the state of each light/air valve switch in the seat-group. If any of the switch circuits for the seat-group are latched on, the SEU generates a data pulse following the corresponding clock pulse. The data pulses are transmitted back to the compartment controller on the seat clock/data line (the compartment controller and SEU never transmit at the same time, allowing them to use the clock/data lines on a time-sharing basis). One pair of data bits (B1 and B2, called Chime and Chime' - read Chime and Chime prime) are always data opposites; this data pulse pair functions as a data enable check bit for the compartment controller and the decoder.

The compartment controller also generates an internal data-enable check bit. If both the compartment controller and seat check bits are present, the compartment controller converts the seat data pulses to the decoder format and retransmits them on the corresponding decoder clock/data line.

The decoder for the seat-group being interrogated receives the clock and data pulses. The clock pulses are counted and converted to decoder internal bit times (B0-B15). If the Chime/Chime' check bit pulses are data opposites, the decoder logic circuits interpret the following data pulses and switch lights on or off, or change the position of the individual air outlet
R (IAO) valves. Each SEU communicates with the corresponding decoder once during each frame.

During their active seat-group-time, the decoders transmit data pulses to the compartment controllers on the CC Comm lines to identify the type of seat-group. The decoders are internally identical, but each decoder is externally addressed by aircraft wiring to function as a lavatory, passenger, passenger/attendant, or end-of-zone (EOZ) decoder. In addition, if any test mode commands have been received by the decoder, test result data pulses are transmitted to the compartment controller on the CC Comm line.

After the SEU and decoder have counted 16 clock pulses (Ref. Figure 7), they switch to the inactive state. During the inactive state, the clock/data lines are connected through the SEU and decoder, providing a through path from the compartment controller to the next SEU and decoder along the column, which then switch from the ready to the active state. When an SEU and decoder have switched to the inactive state, they
R remain inactive until the next frame synchronization resets them to the ready state.

When the second SEU and decoder have counted 16 clock pulses, they switch to the inactive state, and the next SEU and decoder along the seat-group column detect the next clock pulse and switch to the active state. This sequence is repeated until all of the seat groups along the column have been interrogated. The SEU and decoders remain inactive until the next frame sync; then the interrogation direction is reversed and the process is repeated.

(a) PSS_Reading_Lights_On/Off_Function

When a PCU reading light switch is selected to on, a ground is connected to the corresponding SEU reading light logic circuit. The logic circuit latches, and each time the SEU is interrogated a data pulse is transmitted on the seat clock/data line following the appropriate clock pulse (B5, B9, or B13 for Read Light 1, 2, or 3, respectively).

The decoder internal power supply provides 27V ac to the reading lights on the corresponding PSM. When a reading light data pulse is detected by the decoder, a switching circuit provides a ground to the reading light. When the PCU light switch is selected off, the SEU logic circuit resets, and no reading light data pulses are generated. The decoder no longer detects a data pulse during the reading light bit (B) time, the switching circuit opens, and the reading light goes off.

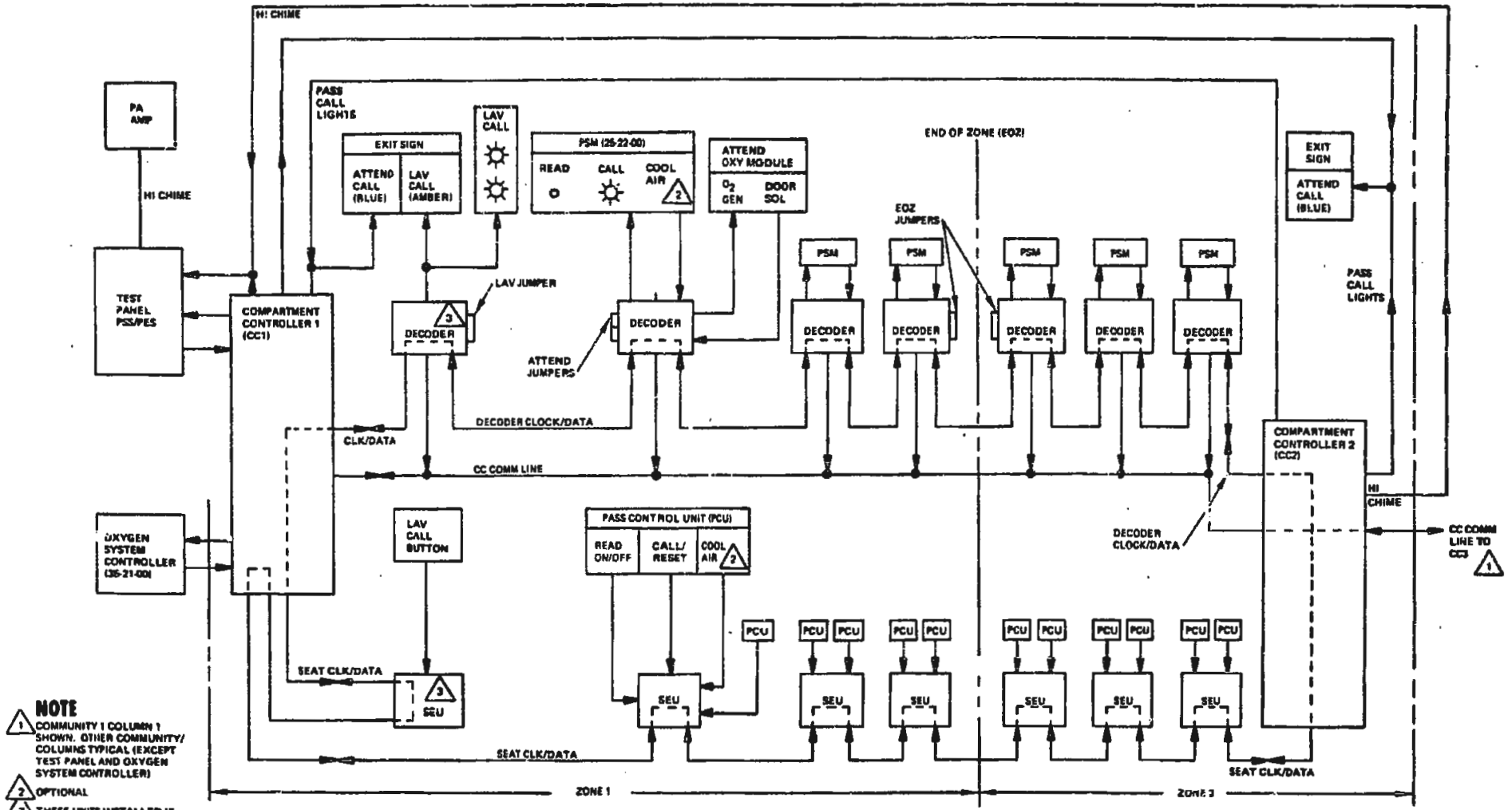
R

(b) PSS Attendant Call Functions

When an attendant call switch is pulled, a ground is connected to the corresponding SEU call light logic circuit. The logic circuit latches, and each time the SEU is interrogated a data pulse is transmitted on the seat clock/data line following the B8 clock pulse (Any Call).

During every seat group time when no call has been initiated, a data "0" pulse (Chime) is transmitted by the SEU after clock pulse B1, and a data "1" pulse is transmitted after clock pulse B2. When a call is initiated, the SEU Chime/Chime' logic circuit latches. During the first frame after the call switch is pulled, a data "1" pulse is transmitted following the B1 clock pulse, and a data "0" pulse is transmitted following the B2 clock pulse. After one Chime data pulse has been transmitted, the Chime/Chime' logic circuit resets, and will not transmit another Chime data pulse until the call circuit is manually reset and the call switch is pulled again. This satisfies the requirements for an attendant call chime, and for the data enable check bit pulses by maintaining B1 and B2 as data opposites during every seat group time.

The compartment controller (CC) operation is the same as for reading lights, except that it also detects the Chime (B1) and Any Call (B8) data pulses from the SEU, and the community end-of-zone



NOTE

1. COMMUNITY 1 COLUMN 1 SHOWN. OTHER COMMUNITY/ COLUMNS TYPICAL (EXCEPT TEST PANEL AND OXYGEN SYSTEM CONTROLLER)
2. OPTIONAL
3. THESE UNITS INSTALLED IF LAVATORY CALL IS UNDER PSS CONTROL

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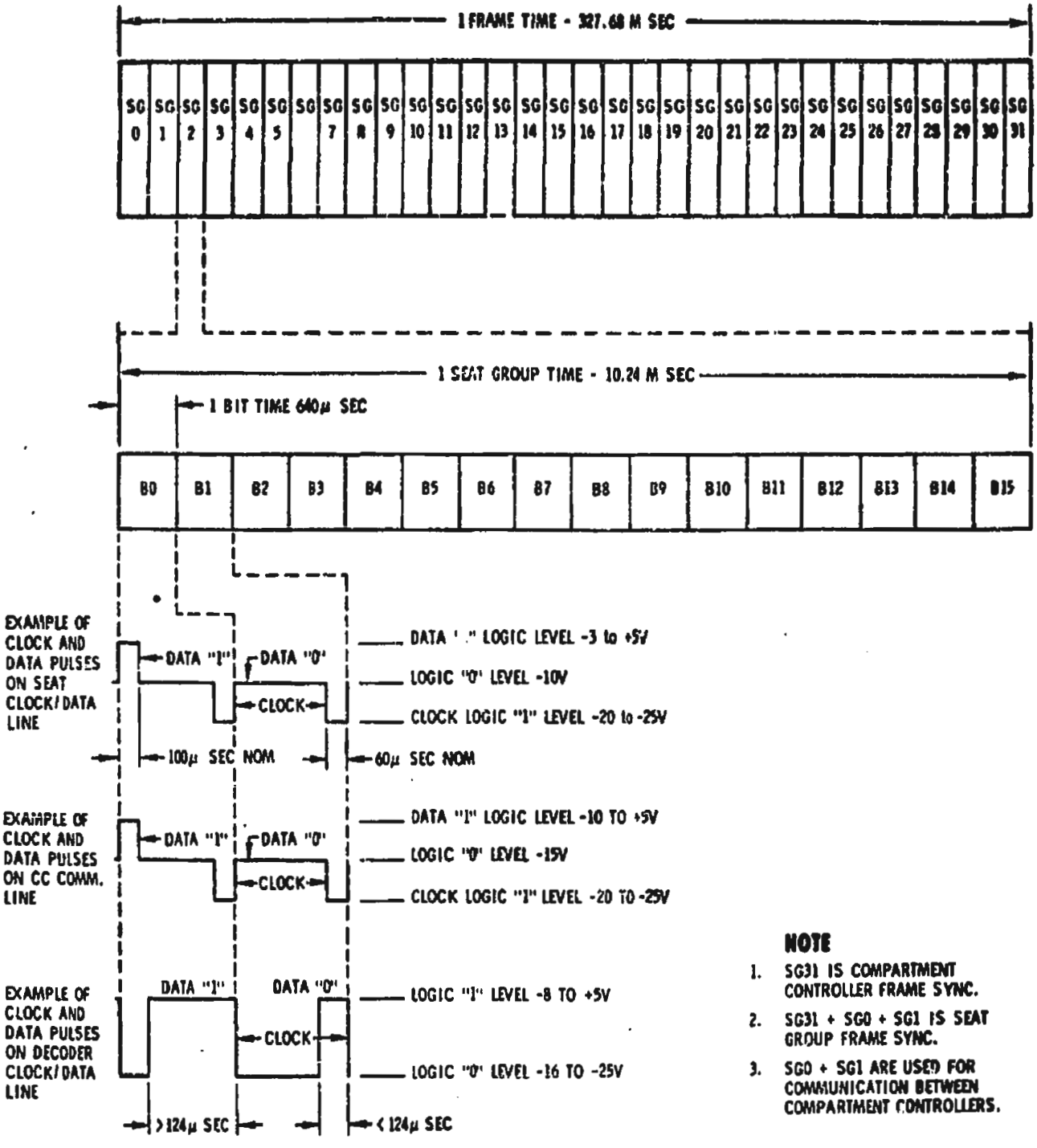
R R PSS Block Diagram
Figure 6

R R EFFECTIVITY: ALL

001B


1 FRAME TIME - 327.68 M SEC
SG 0 SG 1 SG 2 SG 3 SG 4 SG 5 SG 7 SG 8 SG 9 SG 10 SG 11 SG 12 SG 13 SG 14 SG 15 SG 16 SG 17 SG 18 SG 19 SG 20 SG 21 SG 22 SG 23 SG 24 SG 25 SG 26 SG 27 SG 28 SG 29 SG 30 SG 31
1 SEAT GROUP TIME - 10.24 M SEC
1 BIT TIME 640μ SEC
B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15
EXAMPLE OF CLOCK AND DATA PULSES ON SEAT CLOCK/DATA LINE
DATA "1"
DATA "0"
CLOCK
100μ SEC NOM
60μ SEC NOM
DATA "1" LOGIC LEVEL -3 to +5V
LOGIC "0" LEVEL -10V
CLOCK LOGIC "1" LEVEL -20 to -25V
EXAMPLE OF CLOCK AND DATA PULSES ON CC COMM. LINE
DATA "1"
DATA "0"
CLOCK
DATA "1" LOGIC LEVEL -10 TO +5V
LOGIC "0" LEVEL -15V
CLOCK LOGIC "1" LEVEL -20 TO -25V
EXAMPLE OF CLOCK AND DATA PULSES ON DECODER CLOCK/DATA LINE
DATA "1"
DATA "0"
CLOCK
LOGIC "1" LEVEL -8 TO +5V
LOGIC "0" LEVEL -16 TO -25V
>124μ SEC
<124μ SEC

NOTE

1. SG31 IS COMPARTMENT CONTROLLER FRAME SYNC.
2. SG31 + SG0 + SG1 IS SEAT GROUP FRAME SYNC.
3. SG0 + SG1 ARE USED FOR COMMUNICATION BETWEEN COMPARTMENT CONTROLLERS.

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R
R

PSS Data Format
Figure 7

(EOZ) (B10 or B11) data pulse from the decoder (on the CC Comm line), and uses the pulses to generate chime and attendant advisory (call) light signals.

The CCs use the EOZ data pulses to determine from which PSS community and zone the attendant call signal originated. If the Chime pulse originated from a seat group in zones 1 or 2 (community 1 forward area), a 28V dc pulse is routed from CC1 or CC2 to passenger address amplifier No. 1 to sound a forward cabin area HI chime (Ref. 23-31-00). If the Chime pulse originated from a seat group in zone 3 or 4 (community 1 aft area), a 28V dc pulse is routed from CC1 or CC2 through CHIME control switch on the MULTIPLEXER PSS/PES TEST panel to passenger address amplifier No. 2 to sound a mid and aft cabin area HI chime. All chime output pulses from CC3 and CC4 (community 2) are routed through the test panel CHIME switch to passenger address amplifier No. 2 to sound mid and aft cabin area HI chimes.

The CCs also use the EOZ pulses in conjunction with the Any Call (B8) pulse to turn on attendant advisory (call) lights (Ref. 33-26-00). The attendant advisory lights are mounted on the bottom of the EXIT sign above each passenger door. An Any Call pulse originating from a passenger seat group in any zone will turn on a blue attendant advisory light in the same zone.

R On aircraft 001-031, any Call pulse originating from a lavatory seat group will turn on an amber attendant advisory light on the EXIT sign adjacent to the lavatory (the amber lavatory attendant advisory lights are controlled by the lavatory decoders, and are in parallel with the amber call lights in the lavatory and on the ceiling outside the lavatory).

The blue attendant advisory lights in zones 1, 2, 3, and 4 are alternately controlled by CC1 and CC2. The blue attendant advisory lights in zones 5, 6, 7, and 8 are alternately controlled by CC3 and CC4.

When an Any Call pulse is detected from a passenger seat-group in any zone, the compartment controllers provide a ground to the corresponding blue advisory light. The 28V dc for each advisory light is provided by a decoder near the corresponding EXIT sign.

The CC converts the SEU Any Call pulse to decoder data format and retransmits on the decoder clock/data line. The decoder detects the Any Call pulse and latches the call light logic circuit latches, and provides a ground to the blue call light on the PSM associated with that passenger seat group; or on aircraft 001-031, the amber lights on the lavatory wall, the ceiling outside the lavatory door, and on the EXIT sign adjacent to the lavatory. The ground remains for as long as the Any Call data pulse is present during each frame.

When a Call switch is depressed, a voltage-dropping resistor is connected to the corresponding SEU call light logic circuit, causing the circuit to unlatch. In addition, on aircraft 001-031, all forward or all aft lavatory call lights can be reset from LAV RESET switchlights on the left forward and left aft cabin attendant panels, respectively. When the call light logic circuit is reset, the Any Call pulse is no longer generated. The compartment controller and the decoder no longer detect the Any Call data pulse, and the call and attendant advisory lights go off.

(c) Air Valve Function (Optional on some aircraft)

When a PCU air switch is depressed, the corresponding SEU cool air circuit provides one output pulse. The air switch alternately grounds and ungrounds the cool air logic input, and the logic reacts to either change-of-state by latching. When the seat group is interrogated, the cool air circuit generates one cool air data pulse which is transmitted on the seat clock/data line following the appropriate clock pulse (B6, B10, or B14 for Cool Air 1, 2, or 3, respectively). When one cool air pulse has been transmitted, the cool air logic circuit resets.

R The decoder provides 28V dc to the Individual Air
R Outlet (IAO) valve solenoids on the corresponding PSM. When a cool air data pulse is detected by the decoder, a cool air logic circuit provides one pulse to turn on a transistor cool air driver. The transistor driver provides a ground to the corresponding IAO valve solenoid (Ref. 21-23-00) on the PSM. The solenoid advances the valve one position (half open, full open, or closed).

The decoder cool air logic output pulse width ensures that the solenoid can advance the valve one position. After one output pulse, the logic circuit resets, the transistor driver turns off, the ground is removed from the solenoid, and the solenoid deenergizes.

C. PSS Power Distribution and Control

(1) System Power Control - (Ref. Fig. 8) the passenger service system power cutoff relays provide a convenient means for removing electrical power from system components, prior to replacement.

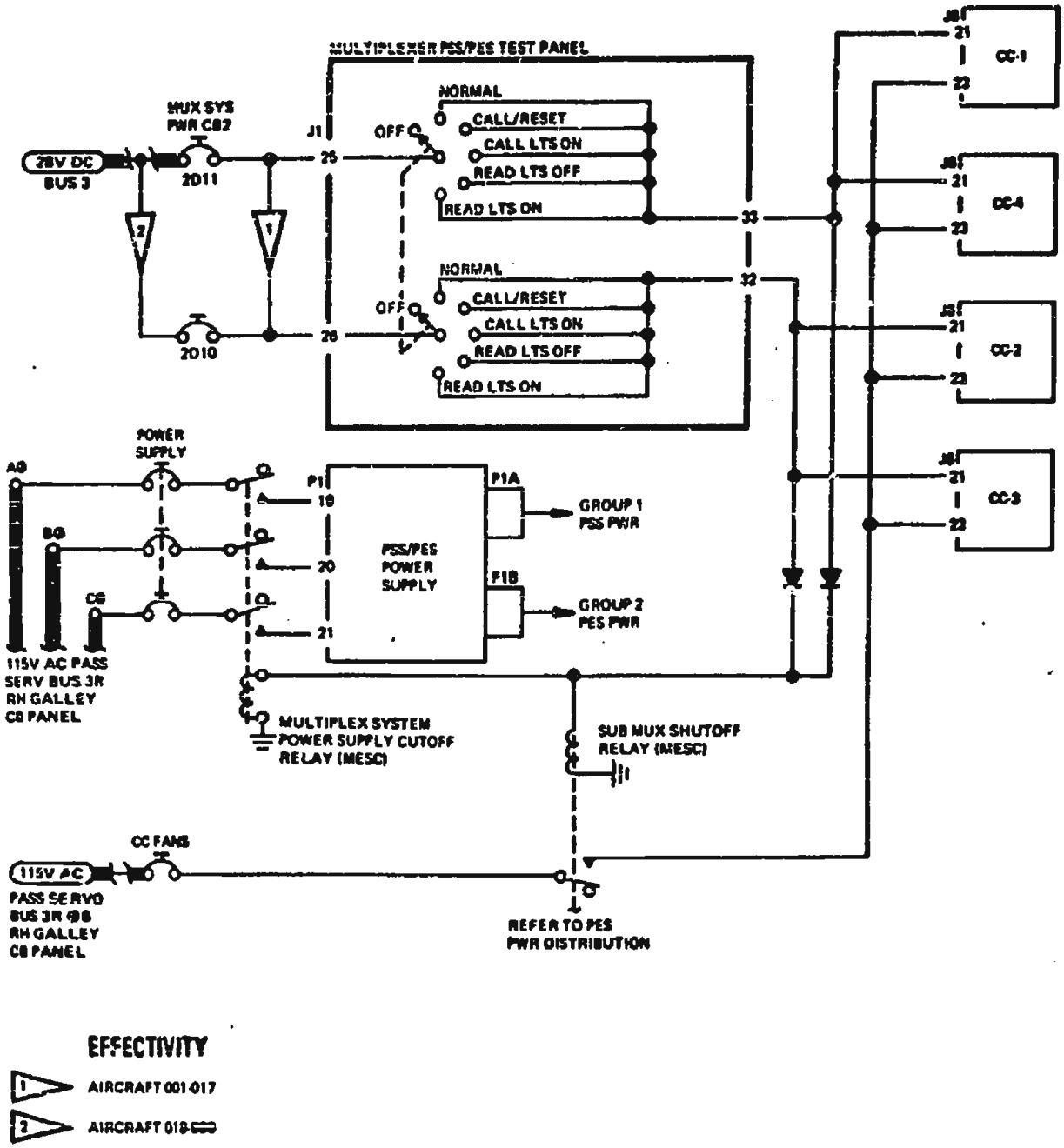
R Circuit breakers controlling the cutoff relays are MUX SYS PWR circuit breakers 2D10 and 2D11 on Pilots Overhead Circuit Breaker Panel CB2. The circuit breakers provide 28V dc to the MULTIPLEXER PSS/PES TEST panel PSS test selector switch. In any position, except OFF, 28V dc is supplied to the four compartment controllers (CC), central power supply cutoff relay. Both relays and the power supply are located in the mid electrical service center (MESC), Ref. Fig. 9.

Three-phase 115V ac power is supplied, through the energized contacts of the power cutoff relay, to the central power supply.

(2) PSS DC Power Distribution - (Ref. Fig. 10) the power supply unit, located in the mid electrical service center (MESC), provides the DC operating voltages for the seat electronic units, the decoders and the compartment controllers.

The power supply output is divided into five cable runs, labeled A through E on Figure 10. Cable run A feeds terminal boards (TB) 5 and 4. TB5 supplies power to the column one seat electronics units (SEU) through the seat-to-seat cable. From the last SEU (seat position 1) power is supplied to the CC, out of the CC, and to the overhead decoders for column one. Power distribution from the other TBs is similar to the TB5 distribution.

Cable run B supplies TBs 2 and 3; cable run C is routed aft from the power supply unit and supplies TBs 8 and 9, located at FS1152. Cable run D supplies power to TBs 6 and 7, also located at FS1152. Cable run E, also routed aft, provides power to TBs 10 through 13, located in the aft service area, to the CC4.



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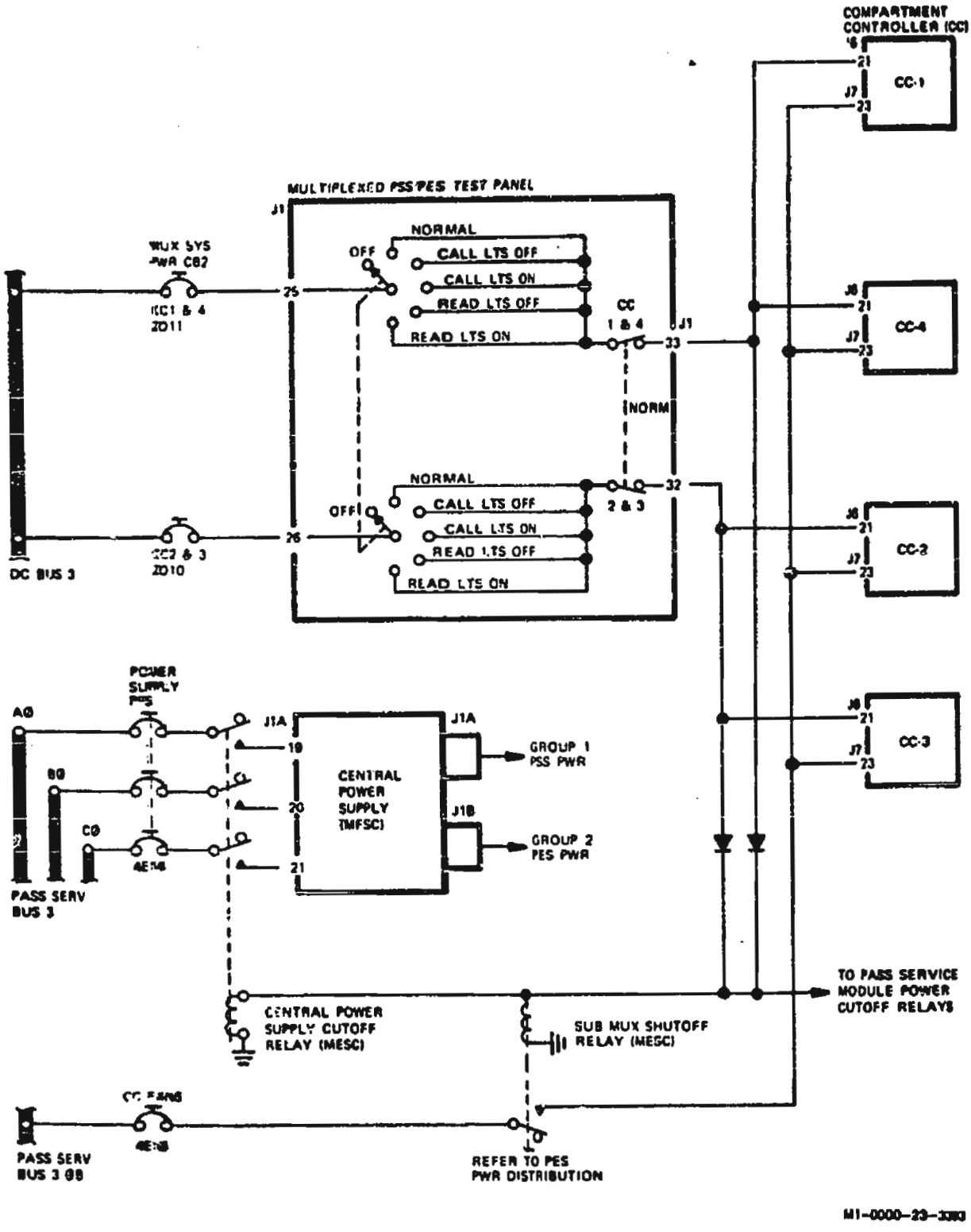
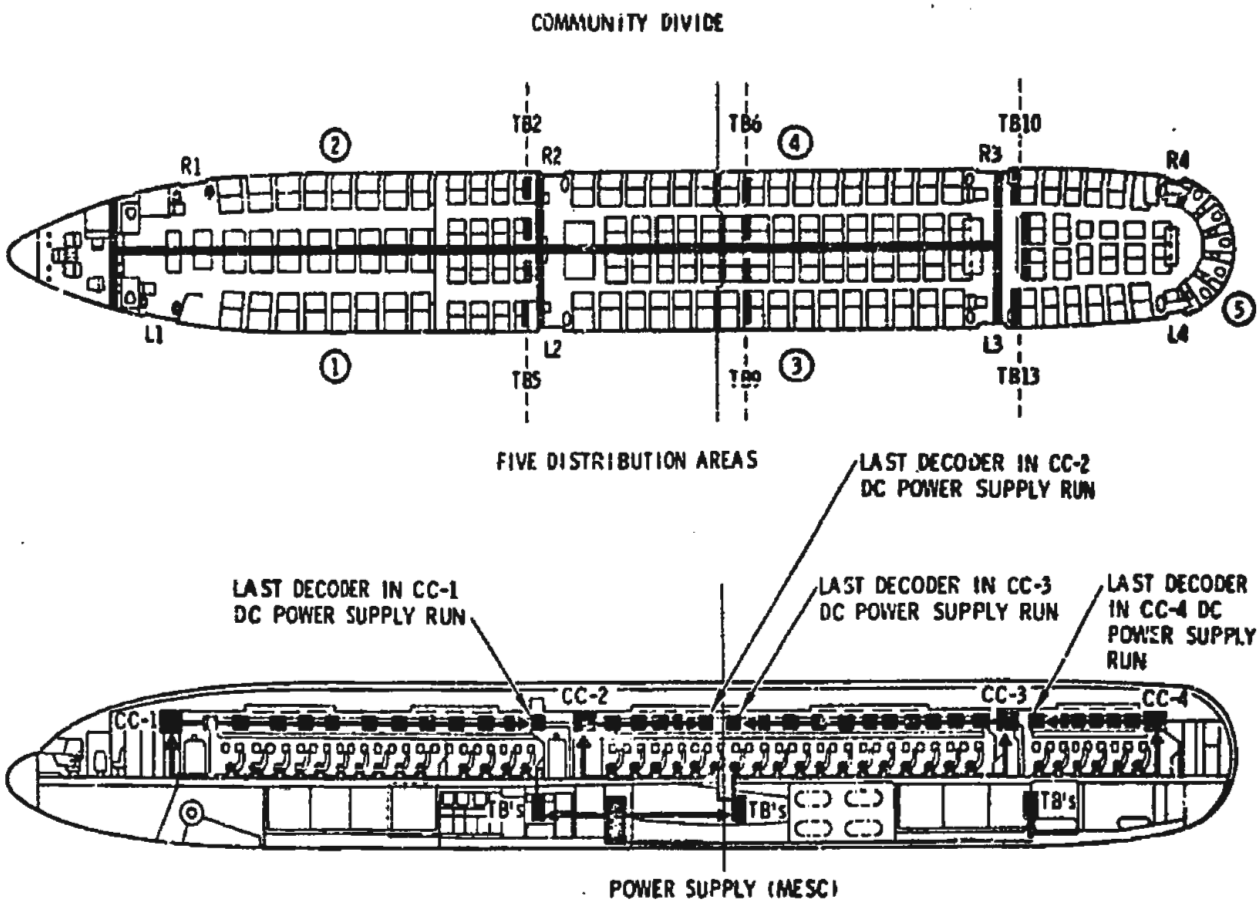
R PSS Power Distribution and Control
R Figure 8 (Sheet 1)

EFFECTIVITY: 001-031



R PSS Power Distribution and Control
R Figure 8 (Sheet 1)

EFFECTIVITY: 032-999



CABLE ROUTING
POWER DISTRIBUTION

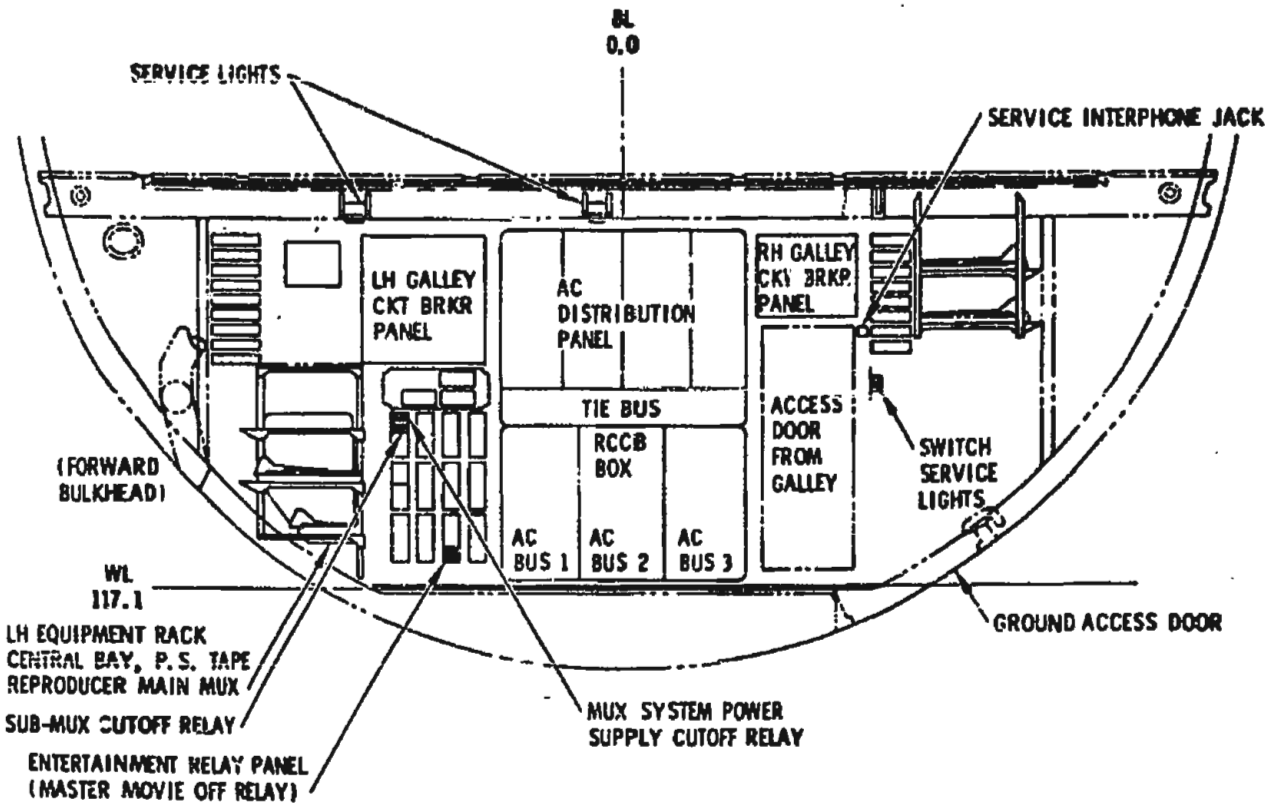
NOTE

THE COMMUNITY DIVIDE MAY VARY DEPENDING ON SEATING CONFIGURATION AND FOR SEAT PITCH. HOWEVER, THE TERMINAL BOARD'S LOCATIONS REMAINS FIXED. ALL TERMINAL BOARDS ARE LOCATED JUST BELOW THE CABIN FLOOR ≈5 IN. IN THE LOCATION SHOWN. TB2-5 ARE LOCATED ≈25 IN. FORWARD OF THE FWD EDGE OF L2/R2 DOORS. TB6-9 ARE LOCATED ≈10 IN. AFT OF THE FWD EDGE OF THE MOVIE PROJECTOR CEILING PANEL. TB10 AND 13 ARE LOCATED ≈10 IN. AFT OF THE AFT EDGE OF L3/R3 DOORS. TB11 AND 2 ARE LOCATED ≈30 IN. AFT OF THE AFT EDGE OF L3/R3 DOORS.

CODE
- ▮ • TERMINAL BOARD LOCATIONS
- ● • SEU
- ▣ • DECODER
- ≈ • APPROXIMATE

M1-0000-23-3314

PSS Power Distribution and Control
Figure 8 (Sheet 2)



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PSS Power Control Relays Location
Figure 9

R Since community divide may vary, depending on seating arrangement/configuration, the terminal board (TB)
R locations remain fixed throughout the aircraft. The
R TBs are located just below the cabin floor. Terminal
R boards 2 through 5 are located about 25-inches forward
R of the forward edge of L2/R2 doors, TBs 6 through 9 are
R located about 10 inches aft of the forward edge of the movie projector ceiling panel, TBs 10 and 13 are located about 10-inches aft of the aft edge of L3/R3 doors, and TBs 11 and 12 are located about 30-inches aft of the aft edge of L3/R3 doors. Sinceon aircraft 001-031, the lavatory seat electronics units (SEU) have no 5V dc regulator, they receive their power from the compartment controller (CC).

Power interconnect is provided by each of the four compartment controllers (CC). For example, the +10/+5V dc from seat column three at J11B is jumpered to J10B for seat column four; this interconnect provides power feedback that ensures a seat column would not lose all operating power should its seat-to-seat cable become disconnected. The three DC operating voltages (10/+5, +25, -25V dc) are interconnected for seat columns one and two, and three and four through CC1. Similarly, CC2, CC3 and CC4 perform the same power interconnect function in their service areas.

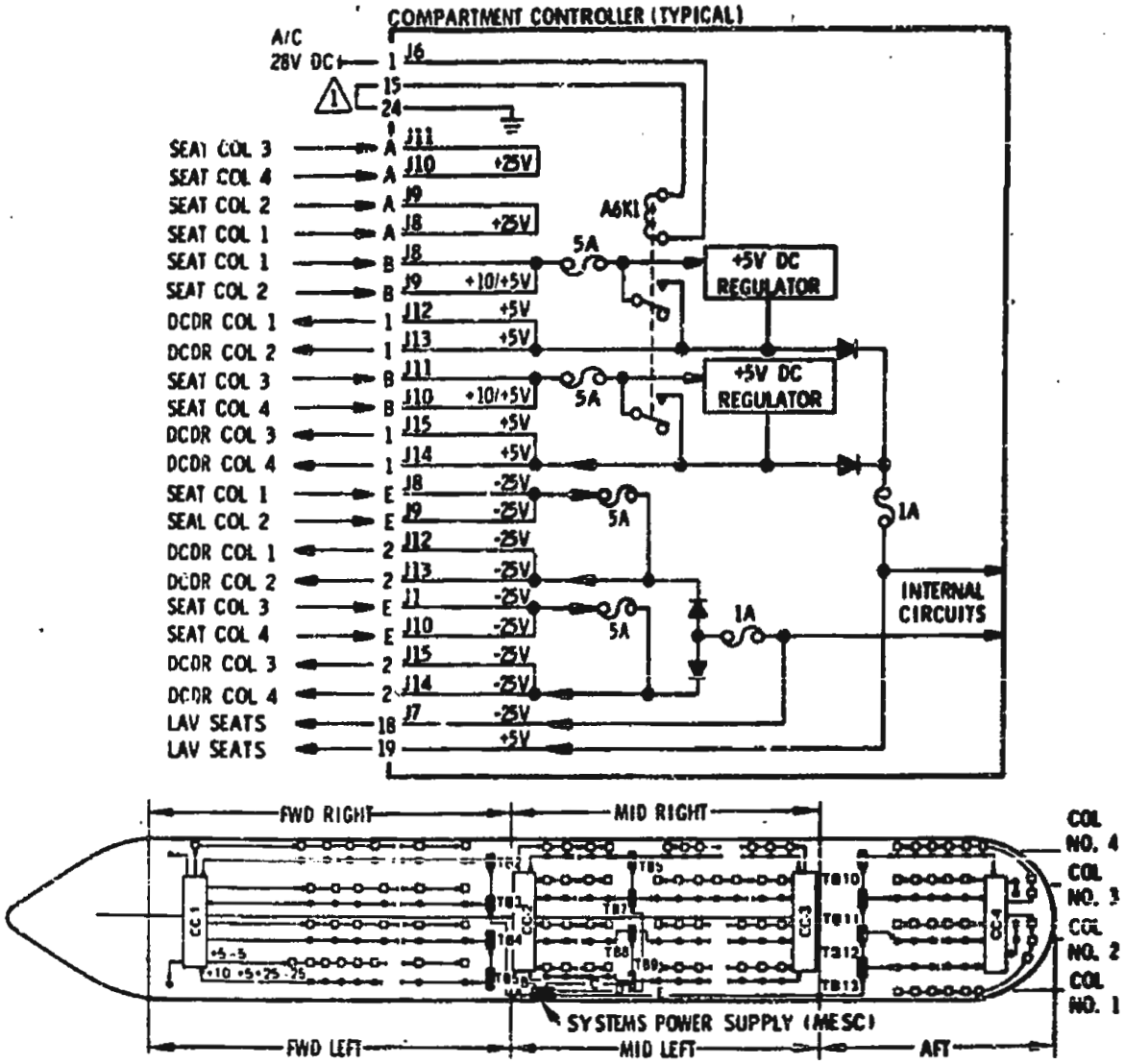
Compartment controller relay A6K1 is energized by the program PSS-ONLY jumper in CC J6 pins 15 and 24. This disconnects the CC +5V dc regulators and routes power supply +5V dc directly through the CC to the decoder connectors (J12, 13, 14 and 15) on PSS-only configured aircraft.

D. PSS Components

(1) Passenger Control Unit (PCU) (Ref. 25-21-00), is mounted in the armrest of each passenger seat and contains the controls/switches for reading light, cool air (optional) and attendant call/cancel functions.

(2) Seat Electronic Units(SEU), the seat electronics unit provides the functional interface between the passenger control unit (PCU) and the compartment controller, and are located at each seat-group position. The total number of SEUs used is dependent upon the aircraft seating configuration. The SEU receives service command voltage levels for each PCU within a seat-group serviced.

(3) Compartment Controllers (CC), the four compartment controllers are internally identical, but they are



NOTE

1. JUMPER INSTALLED ON PSS ONLY AIRCRAFT

FEED LINE A • FWD LEFT
FEED LINE B • FWD RIGHT
FEED LINE C • MID LEFT
FEED LINE D • MID RIGHT
FEED LINE E • AFT
} +25V DC, -25V DC, +10V DC (+5V DC IN PSS ONLY A/C), GROUND

TB LOCATIONS ARE AS FOLLOWS:

TB2-FS	829	WL	195	RBL	106
TB2-FS	829	WL	195	RBL	12
TB4-FS	829	WL	195	LBL	12
TB5-FS	829	WL	195	LBL	106
TB6-FS	1152	WL	195	RBL	94
TB7-FS	1152	WL	195	RBL	20
TB8-FS	1152	WL	195	LBL	30
TB9-FS	1152	WL	195	LBL	94
TB10-FS	1565	WL	195	RBL	96
TB11-FS	1565	WL	195	RBL	23
TB12-FS	1565	WL	195	LBL	15
TB13-FS	1565	WL	195	LBL	96

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PSS DC Power Distribution
Figure 10

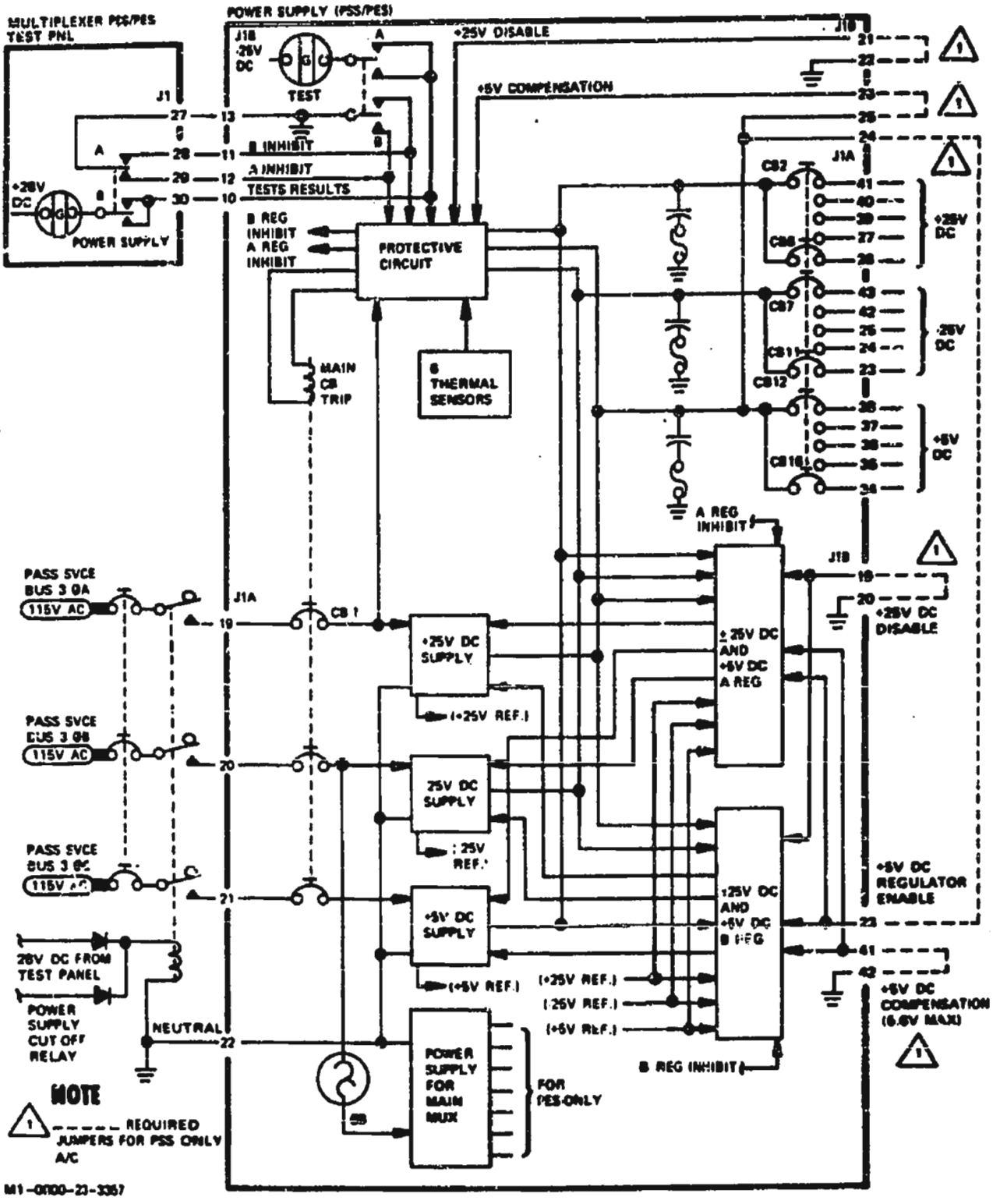
R EFFECTIVITY: ALL
R
0018

externally addressed by aircraft hard wiring to function as CC1, CC2, CC3, or CC4. During normal operation (no compartment controller failures, and no test modes initiated), a crystal-controlled oscillator and divider circuit in CC1 generates clock pulses which are transmitted on CC Comm lines 1 and 4. CC2, CC3, and CC4 detect the clock pulses, inhibit their own clock circuits, and synchronize to CC1. Each compartment controller counts the clock pulses to generate internal bit times (B0-B15), and divides the bit times by 16 to generate internal seat-group times (SG0-SG31). After CC1 has transmitted clock pulses on the CC Comm lines for 31 seat-group times (SG0-SG30), it stops transmitting for one seat-group time (SG31). The absence of clock pulses for one seat-group time is detected by CC2, CC3, and CC4 as compartment controller frame synchronization.

(4) Central Power Supply, (Ref. Fig. 11) the central power supply unit, located in the MESC, is commonly shared between the PES and PSS systems. The unit contains two separate sections, one for the PSS (group 1 outputs) DC operating voltages and one for the PES (group 2 outputs) DC operating voltages. The PSS group 1 outputs power the seat electronic units, decoders and the compartment controllers.

The group 1 section consists of a three-phase transformer, and three dual, feedback regulated, power supplies (+5, +25, and -25V dc). The power supply also contains protection circuits for over-voltage, over-current, under-voltage and over-heating. When the power supply is powering both the PSS and PES systems, the +5V dc supply is unregulated and its output will vary between +8 and +11V dc. This variance is allowed because +5V dc regulators are incorporated in each seat electronics unit supplied by this output. However, if the power supply is providing operating voltage to a passenger-service-system-only configuration, external jumpers are installed in the power supply connector to disable the +25V dc output for seat electronics units PES function, and to enable the +5V dc output regulators in the power supply, since PSS-ONLY seat electronic units do not have +5V dc regulators installed.

The power supply may be tested from a TEST switch on front of the unit or remotely from the MULTIPLEXER
R PSS/PES TEST panel switch, located at the forward right
R flight attendants station.



Central Power Supply
Figure 11

(5) Decoder, (Ref. Fig. 12) the decoder is a self-contained unit consisting of a vented, aluminum alloy cover and a chassis subassembly. The cover forms five of the decoder external surfaces, and contains mounting flanges for installing the unit in the aircraft. The chassis subassembly consists of a front panel on which three electrical connectors and a fuse holder are mounted, and a formed metal chassis and shield on which are mounted a transformer and a circuit card assembly. When assembled, the front panel of the chassis subassembly forms the sixth external surface of the decoder.

The decoder interfaces with the PSS by means of three electrical connectors designated as J1, J2 and J3. Connectors J1 and J2 contain pins for +5 V dc power, -25V dc power, ground, clock/data line and compartment controller (CC) communication line. All other connections are made through connector J3.

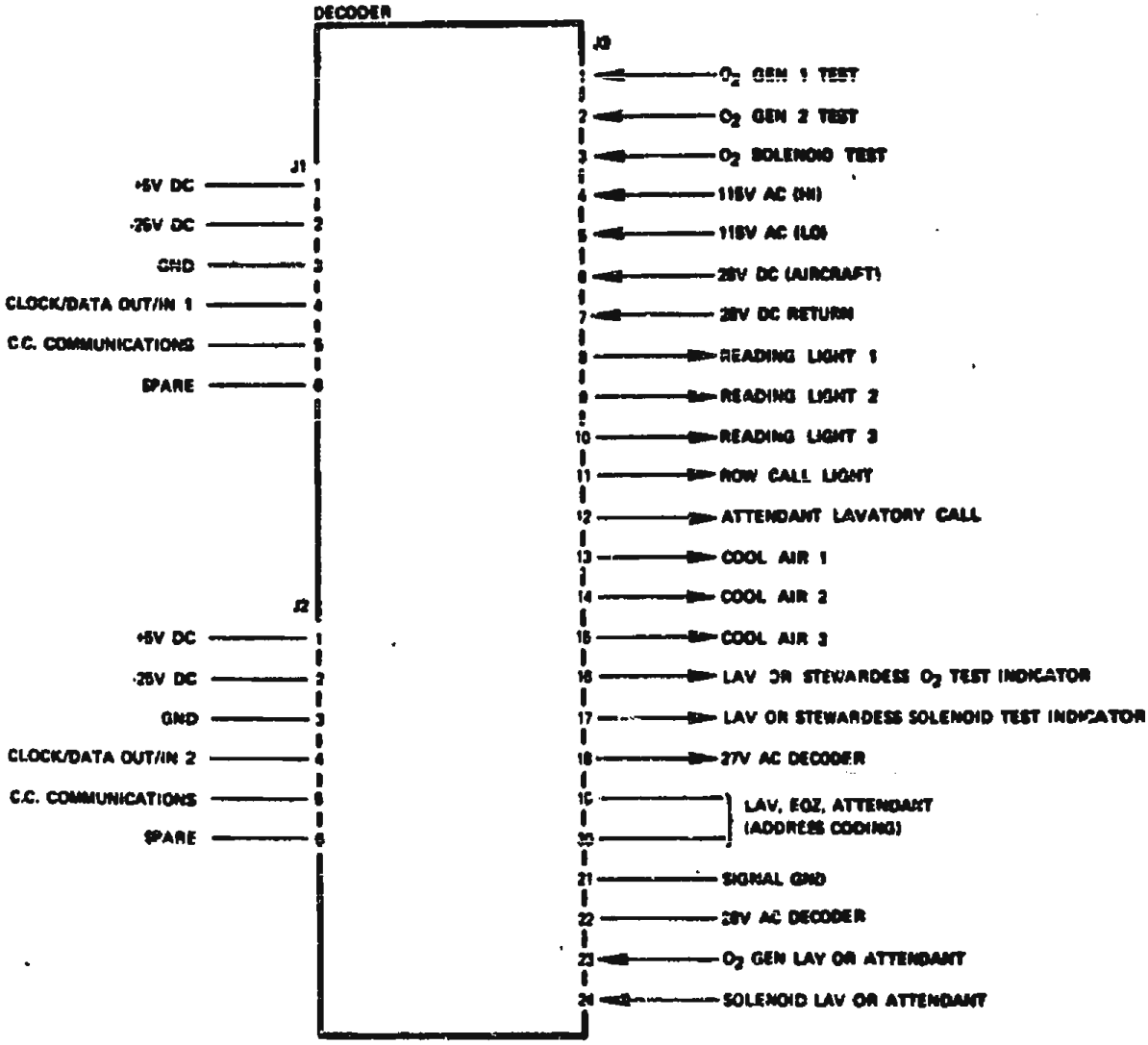
The decoder receives both clock and data pulses on either clock/data terminal 1 (J1-4) or clock/data terminal 2 (J2-4). Sync is detected by the decoder as an absence of clock and data pulses for a fixed interval of time (frame sync). This serves to set, or initialize, the internal logic and prepares the decoder for reception of clock and data pulses.

(6) Passenger Compartment Service Module (PSM), (Ref. 25-22-00) the PSM contains the reading and attendant call lights and air outlet valves (optional) used by the passenger service system. There are two types of PSMs used by the passenger service system: center overhead and outboard/window. The PSM also contains
R the passenger emergency oxygen mask and components
R (Ref. 35-21-00).

(7) Exit Sign Advisory Lights, (Ref. Fig. 3). The attendant advisory lights are mounted on the bottom of the EXIT sign above each passenger door. An Any Call pulse originating from a passenger seat group in any zone will turn on a blue attendant advisory light in the same zone.

On aircraft 001-031,
an Any Call pulse originating from a lavatory seat group will turn on an amber attendant advisory light on the EXIT sign adjacent to the lavatory. The advisory light locations for each zone/lavatory are as follows:

Zone 1/Left forward lavatory EXIT sign above L1 door (One blue and one



ADDRESS CODING			
FUNCTION		J3-19	J3-20
LAVATORY	(LAV)	GROUNDED	OPEN
END OF ZONE	(EOZ)	OPEN	GROUNDED
PASSENGER	(PASS)	OPEN	OPEN
PASSENGER/ATTENDANT	(PASS/ATT)	GROUNDED	GROUNDED

M1-0000-23-3315

Decoder Functional Interface
Figure 12

		amber light)
	Zone 2/right forward lavatory	EXIT sign above R1 door (one blue and one amber light)
	Zone 3	EXIT sign above L2 door (one blue light)
	Zone 4	EXIT sign above R2 door (one blue light)
	Zone 5	EXIT sign above L3 door (one blue light)
	Zone 6	EXIT sign above R3 door (one blue light)
	Zone 7/aft lavatories No. 1 and No. 2	EXIT sign above L4 door (one blue and one amber light)
	Zone 8/aft lavatories No. 3 and No. 4	EXIT sign above R4 door (one blue and one amber light)

(8) PA Amplifiers, (Ref. 23-31-00) provide high-tone chime amplification for the compartment controller (CC) outputs. The forward (Zones 1 and 2) section is serviced by PA amplifier 1, and the mid and aft (Zones 3-8) sections are serviced by PA amplifier 2.

E. PSS Testing and Fault Indicators

(1) MULTIPLEXER PSS/PES TEST Panel

The MULTIPLEXER PSS/PES TEST panel (Ref. Fig. 13) controls the distribution of built-in-test signals throughout the passenger service system. The panel is located by the right forward attendants station, zone 224.

When the PES and PSS selector switches are in the NORM position, failures are indicated by the fault lights on the test panel. Testing of the passenger service system (PSS) is controlled from the test panel by operating the test selector switch and observing the on or off state of the associated fault lights as follows:

NOTE: The PES test selector (left rotary switch) is part of the passenger entertainment system. The selector has no function in passenger service system testing, and it should be left in the NORM position.

(a) When the LAMP TEST switch is depressed, all lights on the test panel come on. If a light fails to come on, the lamp is defective.

(b) When the POWER SUPPLY (PWR SUP) A-B toggle switch is set to A or B, the POWER SUPPLY light comes on. If the POWER SUPPLY light does not come on, a failure is indicated in Group 1 (A or B) outputs of the power supply.

(c) When the PSS test selector is set to READ LT - ON, all the passenger reading lights in the aircraft and the test lights on the lavatory, lounge, and cabin attendant oxygen module assemblies (Ref. 35-21-11) come on. A failure is indicated if a reading light, a group of reading lights, or a test light does not come on.

(d) When the PSS test selector is set to READ LT - OFF, all the reading lights in the aircraft and the test lights on the lavatory and cabin attendants oxygen module assemblies go off. A failure is indicated if a reading light, a group of reading lights, or the test lights do not go off.

(e) When the PSS test selector is set to CALL LT ON, all the call lights in the aircraft come on and the attendants (HI) chimes sound. A failure is indicated if a call light or group of call lights does not come on, or if chimes do not sound in the forward, mid, and aft cabin areas.

(f) When the PSS test selector is set to CALL/RESET (OFF), all the call lights in the aircraft go off. A failure is indicated if a call light or group of call lights does not go off.

(g) When the PSS test selector is set to NORM, the test panel monitors PSS system operation.

(h) The SYS OFF (PULL) selector switch position removes DC power from the compartment controllers and decoders, and AC power from the central power supply and submultiplexers. This switch position is used to remove power from the system during prolonged periods of maintenance with power applied and should result in increased component life.

(i) The test panel CHIME switch inhibits all attendant call chimes when it is selected to the OFF position. The CHIME - ON position allows normal attendant call chime operation. R

R On aircraft 001-031 with SB23-030 R2 and 032-999, the CHIME selector switch has a MAINT position added and the MUX test panel has a dual chime inhibit module added. With the CHIME selector switch in ON, the chime signal is routed through the inhibit module, provided the module has not received a chime signal in past four seconds. If a ranging chime fault occurs, the inhibit module will automatically inhibit the chimes. The inhibit module may be bypassed by setting the CHIME selector switch to MAINT position, therefore allowing the ranging chime problem to occur for maintenance fault isolation functions.

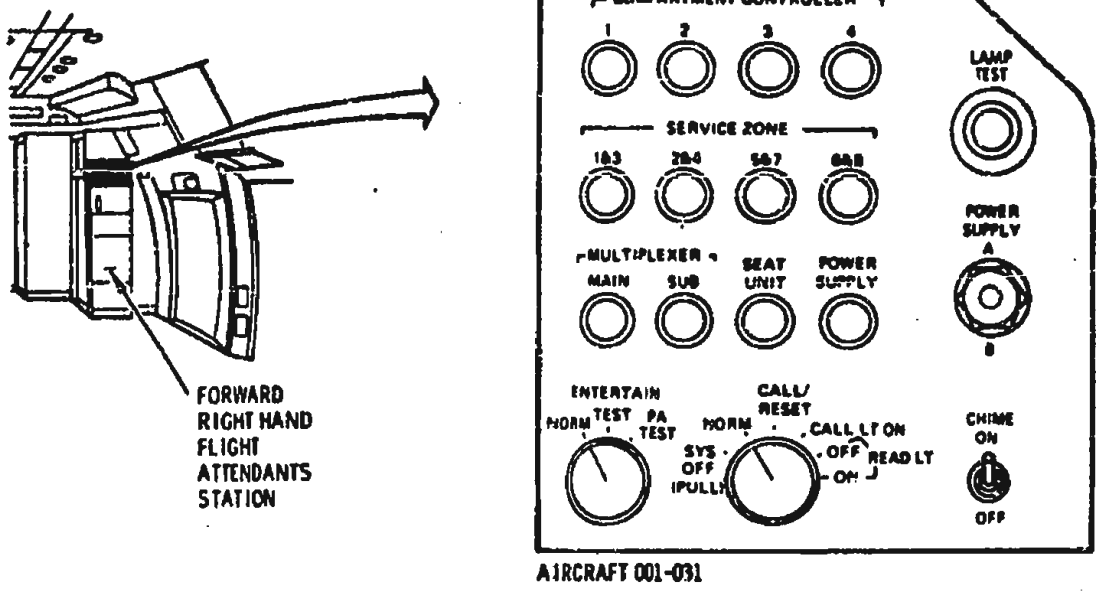
(j) On aircraft 032-999, the test panel CC switch selects NORM, CC1&4 or CC2&3 operational modes, for one way interrogation of the SEUs during maintenance/fault isolation. The CC switch, when set to 1 & 4 or 2 & 3, inhibits 28 VDC from either PASSENGER SERVICE MULTIPLEX SYSTEM CC 1 & 4 (D11) or CC 2 & 3 (D10) circuit breaker on the Flight Engineer/Second Officer overhead circuit breaker panel CB2, forcing one way operation in 1 & 4 position and system fail in 2 & 3 position, due to CC1 power loss. Switch should always be set to NORM position upon completion of system test.

(2) READ LT ON/OFF Tests (Ref. Fig. 14)

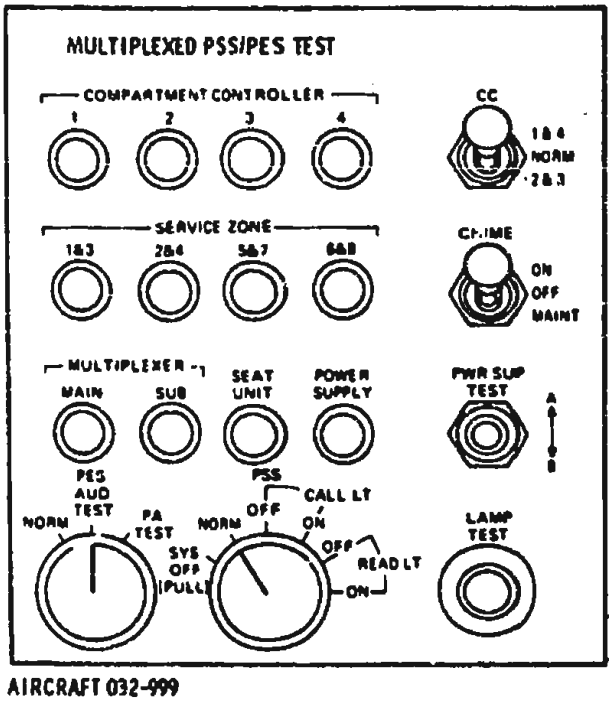
The reading lights on and reading lights off tests are specific tests of the overhead decoders. The tests are controlled from the MULTIPLEXER PSS/PES TEST panel READ LT switch position which initiates circuitry in compartment controller (CC) No. 1 that sends the reading lights on signal (Bit 3), seat group zero (B3, SG0) to CC4 on the CC Comm line No. 1 to inform community 2 of the test, disconnects (electronically) the reading lights input from the seat electronic units (SEU) and initiates the generation of Bits 3, 5, 9 and 13 every seat group time, directly out of the decoder clock/data line, to turn on all reading lights.

The READ LT - ON test mode verifies that CC Comm line 1 is a complete circuit from CC1 to CC4, that all decoder reading light and oxygen module test light circuits are operational, and that the decoder clock/data lines are not open.

If CC Comm line 1 is open between CC1 and CC4, the oxygen/read light on test mode command pulse cannot reach CC4, and community 2 will not go into the test



AIRCRAFT 001-031



AIRCRAFT 032-999

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R
R

MULTIPLEXER PSS/PES TEST Panel
Figure 13

EFFECTIVITY: ALL

001B

mode (not all reading lights will be on, and no oxygen module test lights will be on).

If a decoder clock/data line in any column is open between CC1 and CC2, or between CC4 and CC3, the reading lights and oxygen module test lights in the column between CC1/CC4 and the open will be on, but the lights between the open and CC2/CC3 will not come on. An open decoder will give the same indication.

A decoder with defective reading light or oxygen module test light circuits will not provide grounds to the PSM/oxygen module lights, and the lights will not come on.

The reading lights OFF test command from the test panel is sent to CC1 which initiates the reading lights OFF signal (Bit 10, SG0) and sends the data on Comm-line 4 to CCs 2 and 3. Both CCs respond to the bit 10 data by disconnecting the reading lights input from the SEUs and generating bits 5 NOT, 9 NOT and 13 NOT resulting in all reading lights extinguishing.

The two tests (ON/OFF), therefore, verify the proper operation of the following components/functions:

(a) Comm line 1 (Reading Lights - ON) and Comm line 4 (Reading Lights - OFF),

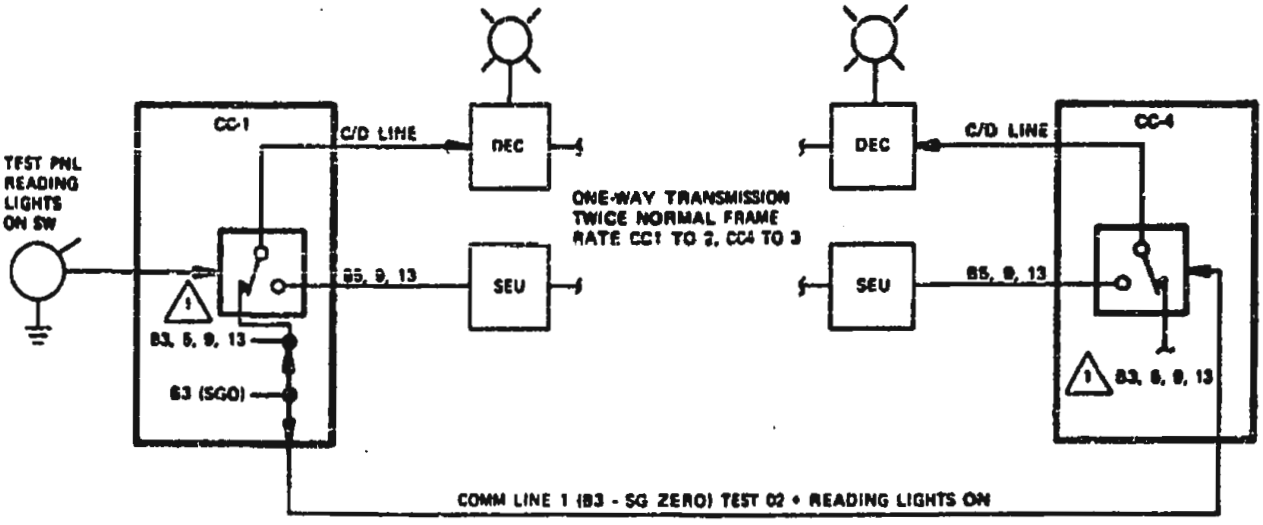
(b) Decoders will respond to reading light commands, therefore will more than likely respond to attendant call light commands and will also pass clock/data to the next decoder (no open/disconnected decoders or cable runs).

Note that it is possible for a decoder to respond properly from transmission in one direction, but fail to respond properly when interrogated from the opposite direction. This type of improper operation is caused by the failure of one-half of the decoder Input/Output (I/O) gates; since the two (ON/OFF) reading lights tests are one-way transmission from opposite directions, both halves of the I/O gates are independently tested.

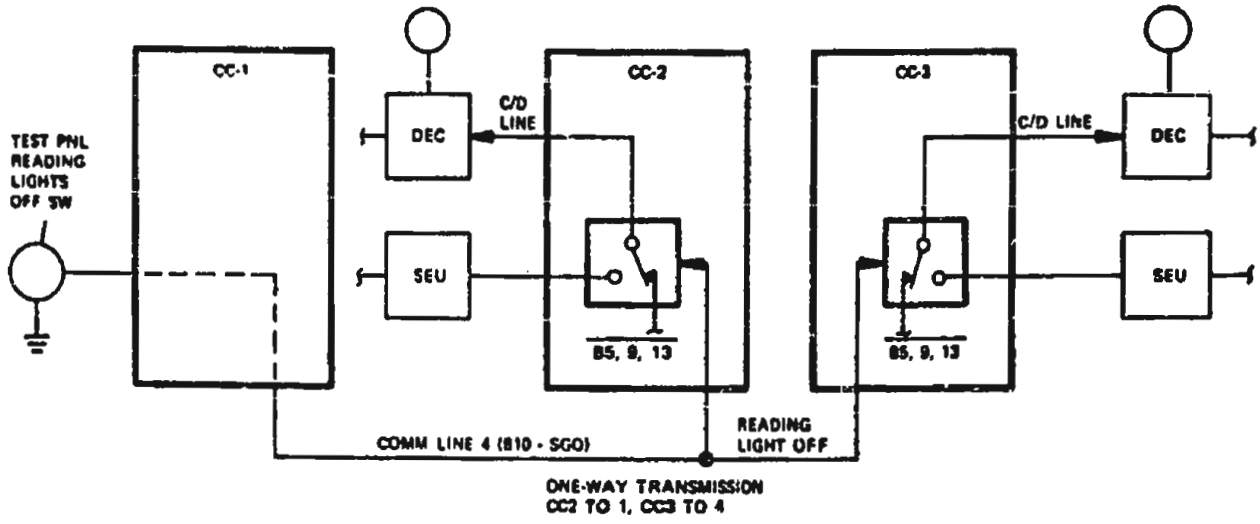
(3) Attendant CALL light Tests (Ref. Fig. 15)

The attendant CALL light tests are a specific test of the seat electronics units, Comm lines 1 and 4 integrity check, compartment controllers (CC) 1 and 4 ability to control the call lights and sound the high

READING LIGHTS ON TEST



READING LIGHTS OFF TEST



1 BIT 3 = TEST O_2 + READING LIGHTS ON
BIT 5 = READING LIGHTS 1 ON
BIT 0 = READING LIGHTS 2 ON
BIT 13 = READING LIGHTS 3 ON

M1-0000-23-3305

Reading Lights On/Off Tests Data Flow
Figure 14

chimes and compartment controllers 2 and 3 ability to respond to CC1 bit commands over the CC Comm line.

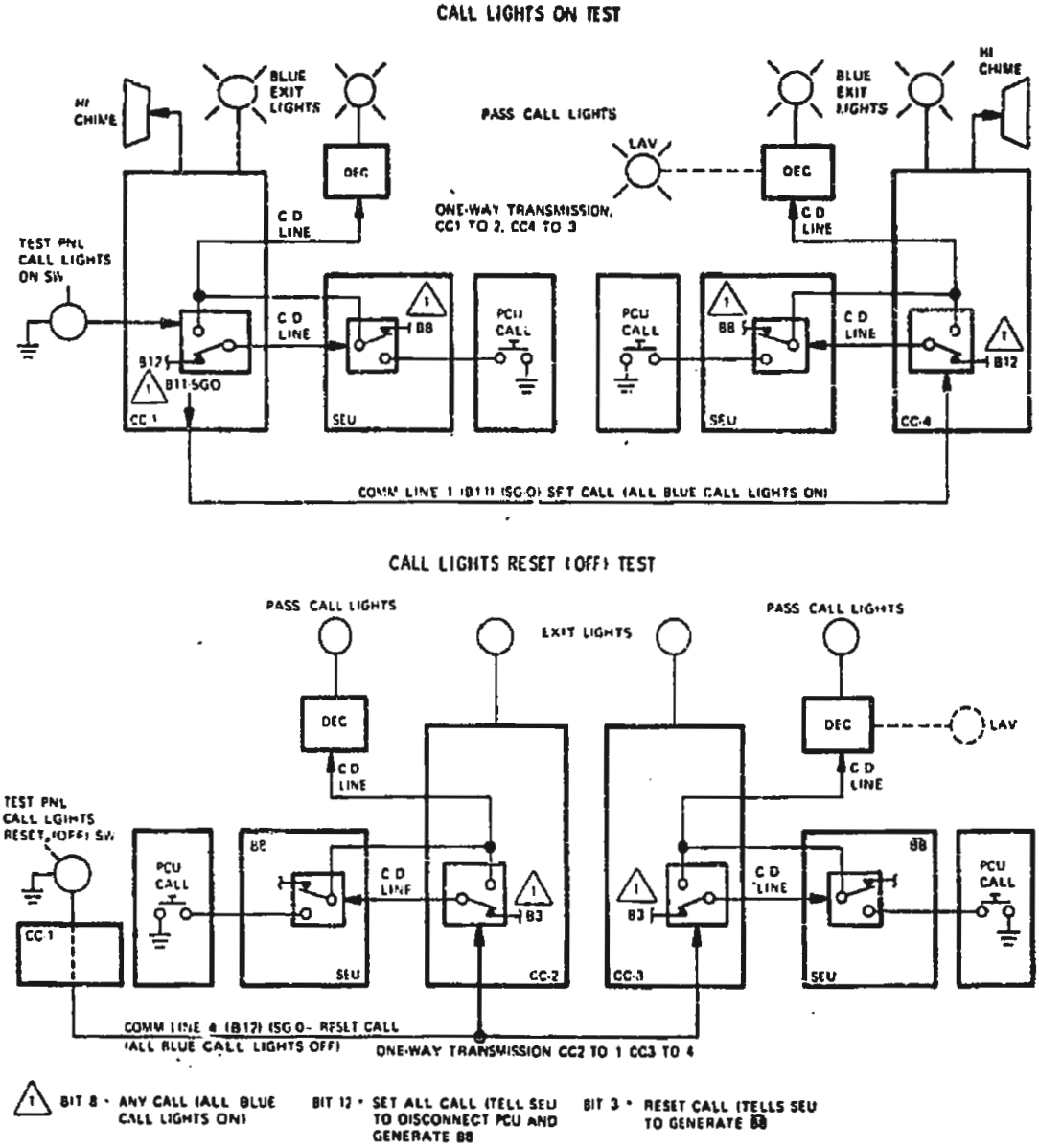
R Selecting CALL LT ON on the MULTIPLEXER PSS/PES TEST panel initiates circuitry in compartment controller (CC) 1 which generates bit 11, seat group zero (B11, SG-0), (set call signal) on Comm line 1 to inform CC4 in community 2 of the test, and also generates bit 12, the set all call command, during every seat-group time on the seat clock/data line to command each community 1 SEU. The SEUs respond by disconnecting the normal passenger control unit (PCU) input and generate bit 8 (Any Call) back to the CC. The CC monitors the Any Call command (bit 8) from the SEU and responds by sounding the high chimes, illuminates the blue passenger call lights on each exit sign and retransmits the command signal to the overhead decoder corresponding to the now active SEU. The overhead decoder will respond to the command signal by illuminating the passenger service module blue call light. This same command data test bit flow is being initiated by CC4 and testing community 2 systems (SEUs, decoders, call lights). Since the READ LT ON/OFF tests are usually performed prior to performing the CALL LT ON test, the proper reading lights test results indicate good decoder performance; therefore, a call light failure during the call light test would indicate improper operation of an SEU.

Selecting CALL light RESET/OFF on the MULTIPLEXER PSS/PES TEST panel causes CC1 to transmit bit 12 of SG-0 (reset call) on Comm line 4 to inform CC2 and 3 of test. CC2 and 3 respond by transmitting bit 3 (reset/off call) on the seat clock/data line to the SEUs, the SEUs respond by generating bit 8 NOT, the call light out command to the decoder which turns off PSM call light.

The CALL light tests verify Comm line 1 (call lights on) and Comm line 4 (call reset/off), the ability of each SEU to generate bit 8 and 8 NOT, and each SEUs ability to respond to interrogation in either direction. As in the decoder, failure of one half of the SEU I/O gates will result in proper operation through the good gate and improper operation through the bad gate. Therefore, the two one-way transmission tests independently test both halves of the SEU I/O gates.

(4) PSS Fault Indicators

(a) COMPARTMENT CONTROLLER, 1, 2, 3, 4 Fail Lights


CALL LIGHTS ON TEST
HI CHIME
BLUE EXIT LIGHTS
DEC
C D LINE
TEST PNL CALL LIGHTS ON SW
B12
B11-SGO
CC-1
SEU
B8
PCU CALL
PASS CALL LIGHTS
LAV
ONE-WAY TRANSMISSION, CC1 TO 2, CC4 TO 3
CC-4
B12
COMM LINE 1 (B11) (SG-0) SET CALL (ALL BLUE CALL LIGHTS ON)
CALL LIGHTS RESET (OFF) TEST
EXIT LIGHTS
TEST PNL CALL LIGHTS RESET (OFF) SW
CC-2
CC-3
B3
COMM LINE 4 (B12) (SG 0- RESET CALL (ALL BLUE CALL LIGHTS OFF)
ONE-WAY TRANSMISSION CC2 TO 1 CC3 TO 4
BIT 8 - ANY CALL (ALL BLUE CALL LIGHTS ON)
BIT 12 - SET ALL CALL (TELL SEU TO DISCONNECT PCU AND GENERATE 88
BIT 3 - RESET CALL (TELLS SEU TO GENERATE 88

MI-0000-23-4280

R Attendant Call Lights Tests Data Flow
R Figure 15

Each compartment controller (CC) contains internal circuits for self-monitoring. The monitored functions include overvoltage/undervoltage, clock detect, clock sync, CC failure, and directional fault.

Failure of any of the monitored functions removes the ground from two internal CC disconnect relays. The relays deenergize and disconnect the compartment controller from the CC Comm lines, the Decoder Clock/Data lines, and the Seat Clock/Data lines for all four columns.

When a compartment controller is disconnected, no CC check data pulse is transmitted on CC Comm lines 1 and 4 during the corresponding SG1, CC check bit time (SG1; B7, B9, B11, or B13 for CC1, CC2, CC3, and CC4 respectively). A check bit detector circuit in CC1 detects the absence of the CC2, CC3, or CC4 check bit and turns on a transistor light driver. The light driver provides a ground to the corresponding test panel COMPARTMENT CONTROLLER fail light. In CC1 only, when the ground is removed from the CC disconnect relays, one set of relay contacts connects a ground to the COMPARTMENT CONTROLLER - 1 fail light on the test panel.

Compartment Controller 1 receives 28V dc from the PASSENGER ENTERTAINMENT - MULTIPLEX SYS - CC1 & 4 (D11) circuit breaker on the pilots overhead circuit breaker panel CB2. The 28V dc is processed through CC1 and connected to the fail lights on the test panel. If CC1 and any other compartment controllers fail (as when the power supply trips off, causing all four compartment controllers to fail), only the CC1 fail light comes on. This is due to the CC2, CC3, and CC4 light drivers in CC1 being inoperative.

(b) SERVICE ZONE, 1&3, 2&4, 5&7, 6&8 Fail Lights

During normal operation (PSS test selector in NORM), the compartment controller in each community which is not transmitting monitors the seat and decoder clock/data lines for open or shorted clock/data loops (circuits). An open loop is an open clock/data line anywhere between the two compartment controllers in either community, or a SEU or decoder which will not switch from the ready/active state to the inactive state after it is interrogated. A shorted loop is an SEU or

decoder which remains in the inactive state, presenting a through circuit on the clock/data line.

After all of the seat groups in a column have been interrogated, the inactive SEU and decoder clock/data circuits present a through path from the transmitting compartment controller to the monitoring compartment controller. The monitoring compartment controller receives the clock pulses for the remaining (unused) seat groups, and compares them to verify that the same number of pulses is received on both clock/data lines for each column. A difference in the number of clock pulses on the seat and decoder clock/data lines for any column is detected as an open or shorted loop.

If an open or shorted loop is detected in any column, the monitoring compartment controller transmits a Zone Fail (PSS error) data pulse on CC Comm lines 1 and 4 at the beginning of the next frame (SG0; B8, B13, B14, or B15 for zones 1 and 3, 5 and 7, 2 and 4, or 6 and 8, respectively) to CC1. In addition, if a shorted loop is detected in any column, the compartment controller which detected the short is inhibited from transmitting clock pulses on the seat and decoder clock/data lines for that column during the next frame. The other (second) compartment controller monitors the clock/data lines during the next frame, and interprets the absence of clock pulses on the clock/data lines of the shorted column as an open loop. The second compartment controller transmits a Zone Fail data pulse at the beginning of the next frame, but it is not inhibited from transmitting clock pulses on the clock/data lines of the shorted column. The compartment controller which first detected the shorted loop detects the same condition again, and the process is repeated. This results in one-way (half-speed) operation for the shorted column, which prevents reading and call lights from flashing on and off (example: a shorted SEU acts as a through circuit; the corresponding decoder is then controlled by the next SEU in the column in the direction of operation. If the direction of operation were allowed to reverse, the decoder would be controlled by the next SEU in the other direction, causing reading/call lights to flash on/off during alternate frames).

A zone fail detector circuit in CC1 detects the Zone Fail data pulse and turns on a transistor light driver. The light driver provides a ground to the corresponding test panel SERVICE ZONE fail light. The SERVICE ZONE lights receive +28V dc power from the suppression circuit in CC1; when the light driver turns on to provide a ground, the light comes on and stays on as long as the Zone Fail data pulse is present during each frame.

The zone fail light drivers in CC1 can only be turned on or off when the test panel service system test selector is in the NORM position. If a SERVICE ZONE fail light is turned on and the test selector is then moved out of the NORM position, the light can not be turned off until the test selector is returned to NORM, even if the open or shorted loop condition is repaired. If the test selector is rotated to any test mode and a loop is then opened or shorted, the SERVICE ZONE fail light can not come on until the test selector is returned to NORM.

R 3. Passenger Entertainment (Audio) System (PES) (Ref. Fig. 16)

A. PES Description

The L-1011 passenger audio entertainment system (PES) provides up to 10 program channels of tape reproducer audio entertainment, selectable at each passenger control unit. The audio may consist of a monaural and/or stereo program combination. Four additional channels of audio (including movie audio) and one passenger address channel which overrides all other audio programs, is also provided. Each passenger can control audio program selection and volume from the passenger control unit located in each seat armrest.

PES components are the tape reproducer (23-35-01), main multiplexer, three (3) submultiplexers. The components shared by the PES with passenger service system (PSS) are compartment controllers (used as junction boxes between the submultiplexers and the seat electronics units in PES functions), seat electronics units (SEU), passenger control units (PCU), central power supply and the MULTIPLEXER PSS/PES TEST panel.

The tape reproducer, central power supply and main multiplexer are located in the mid electrical service center (MESC), LH rack, FS943, zone 137. The three submultiplexers are located above the ceiling panels at passenger

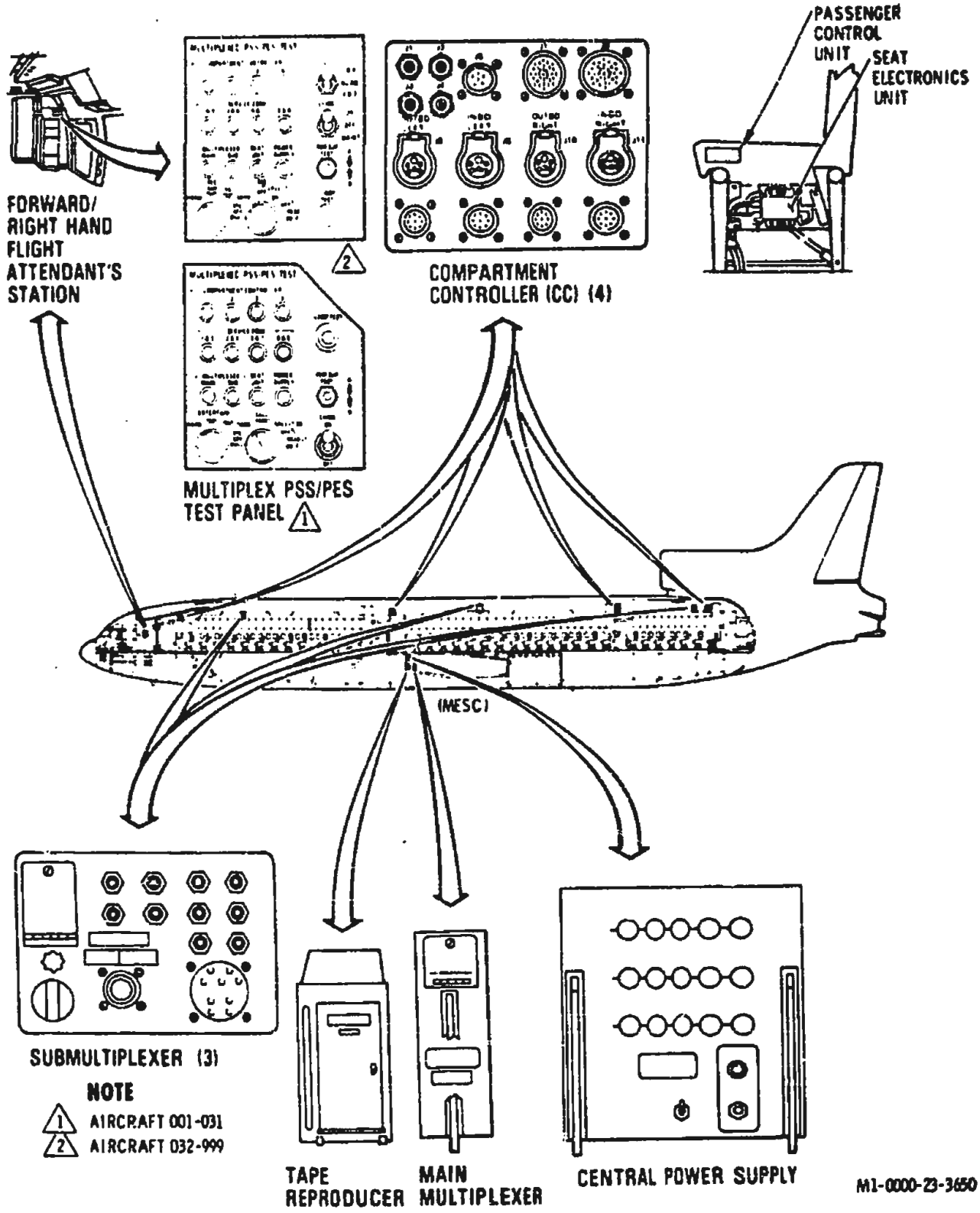
compartment zones 230, 250 and 270 and the four compartment controllers (CC) are located above the ceiling panels at zones 220, 240, 260 and 270. The passenger control units
R are located in each seat armrest. Seat electronic units are
R located in each seat group. The multiplex PSS/PES test
R panel is located at the right forward attendants station, zone 224, just forward of the R1 door. Quantity of seat electronics units will vary with operator seat group configuration. The PES provides audio entertainment to the three cabin entertainment areas. Each area is serviced by one submultiplexer which supplies audio data, through the compartment controller, to the seat electronic units in the area.

Each submultiplexer has eight output coaxial cables. Each
R group of four cables feeds fifteen channels of multiplexed
R audio data to each of four columns of seat electronics
R units. Each column can consist of twenty-nine seat groups
R of up to three seats each. Each seat electronics unit is connected to the passenger control units in the associated seat group. Each seat electronics unit demultiplexes the digitized audio data, decodes the passenger control unit program selector switch position, and transmits the program selected by each passenger under control of the compartment controller (Ref. Fig. 17).

B. PES Operation (Ref. Fig. 18)

R The tape reproducer supplies analog program audio to the main multiplexer which samples and digitizes the audio and adds timing patterns and frame sync pulses. The digitized audio data train is then routed through single coaxial cables to the submultiplexers. In addition, movie and PA system audio is also applied to the submultiplexers where it is digitized and multiplexed with the audio data from the main multiplexer. The multiplexed data is fed to the compartment controller, where it is routed to each of the four coaxial cables (one for each column of seats) in each entertainment area.

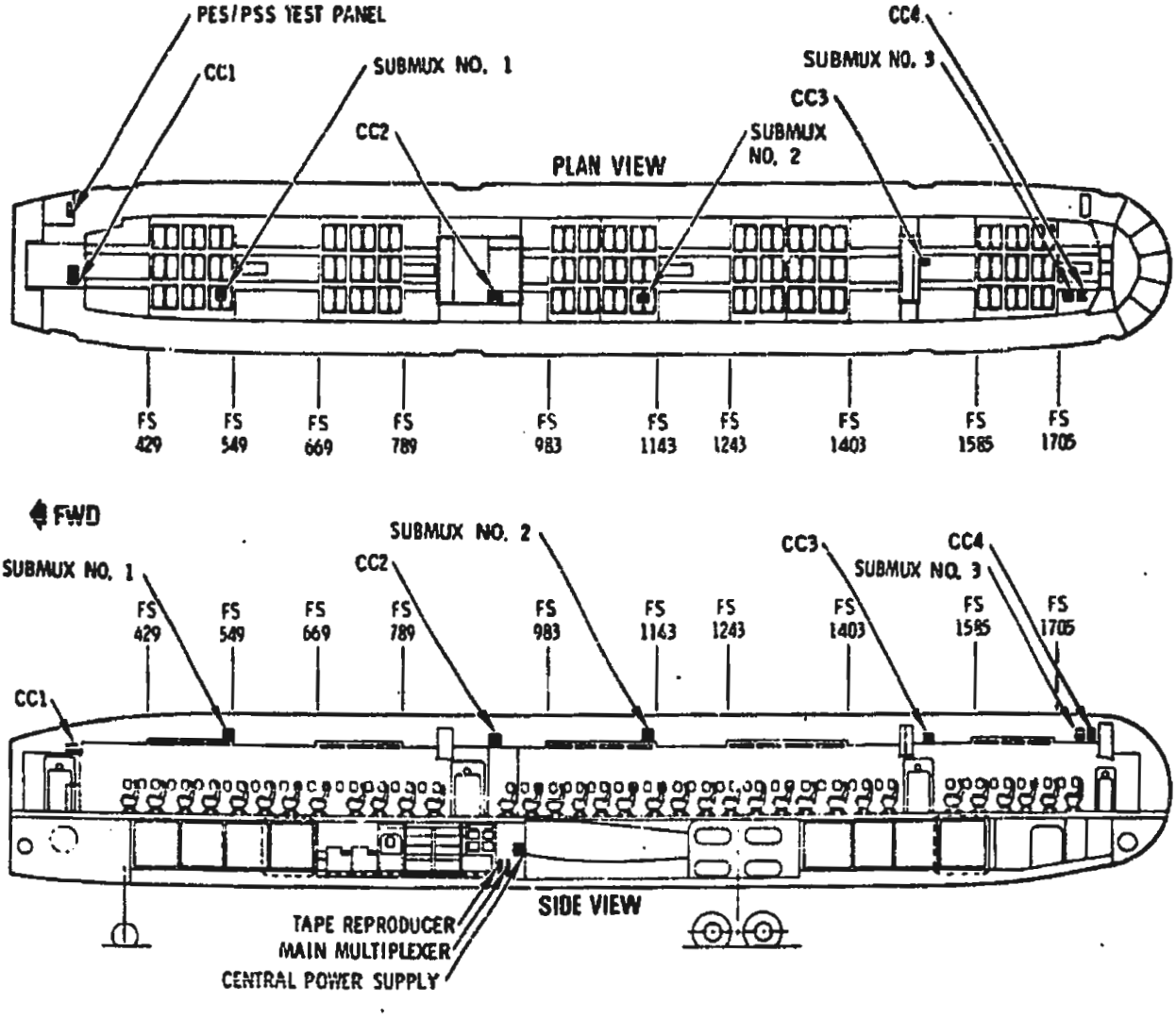
The No. 1 submultiplexer feeds data to No. 1 compartment controller (CC1), through four (4) coaxial cables for use in the forward (No. 1) entertainment area; the No. 2 submultiplexer feeds data to the No. 2 and No. 3 compartment controllers (CC2 and 3) through eight (8) coaxial cables (four each CC) for use in the mid entertainment area; the No. 3 submultiplexer feeds data to the No. 4 compartment controller (CC4) through four coaxial cables for use in the aft entertainment area. Note that the compartment controllers only act as junction/distribution boxes for the audio data coaxial cables.



R PES Component Location
R Figure 16 (Sheet 1)

EFFECTIVITY: ALL

0018



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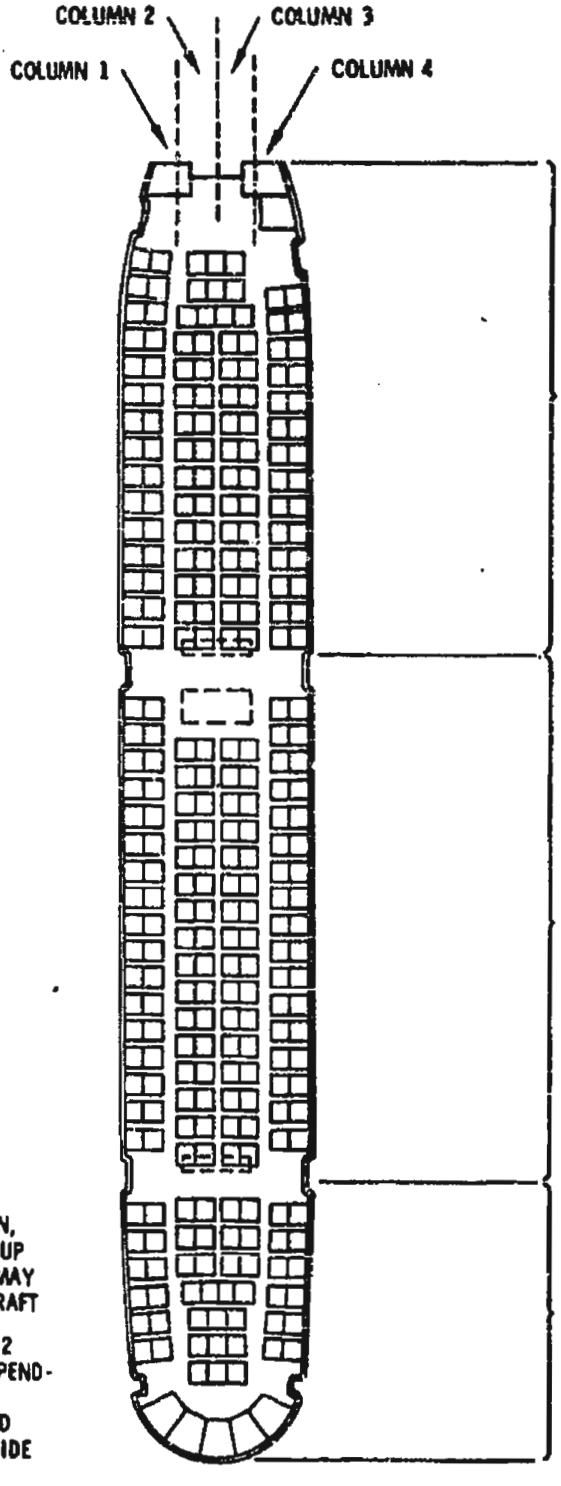
PES Component Location
Figure 16 (Sheet 2)



NOTE
ALL COACH SHOWN, ACTUAL SEAT GROUP CONFIGURATION MAY VARY WITH AIRCRAFT

1 PES AREAS 1 AND 2 ARE VARIABLE DEPENDING ON SEATING ARRANGEMENT AND FIRST-CLASS DIVIDE LOCATION

M1-0001-23-3286

PES Entertainment Areas
Figure 17

The multiplexed audio data is then routed to all seat electronic units (SEU) in each seat group column. The last SEU in each column (end-of-zone) is electrically terminated with an impedance-matching resistor (about 50-ohm). This termination/end-of-zone (EOZ) resistor fixes the entertainment area audio limits and can be made at any seat group in the zone/column, depending on seating configuration. The seat electronics units demultiplex the multiplexed audio data from the CCs. When an audio program channel is selected by the passenger control unit (PCU) program selector, the SEU encodes the program channel selector switch position and feeds the audio channel to the passenger control unit transducer which feeds the audio to the passenger pneumatic earphones.

When the PA system is operated for passenger announcements, the SEU detects the PA data and overrides the passenger control unit program selections and automatically routes the PA announcements to the passenger earphones.

C. PES Power Distribution and Control (Ref. Fig. 19)

Primary power for the system is provided as follows:

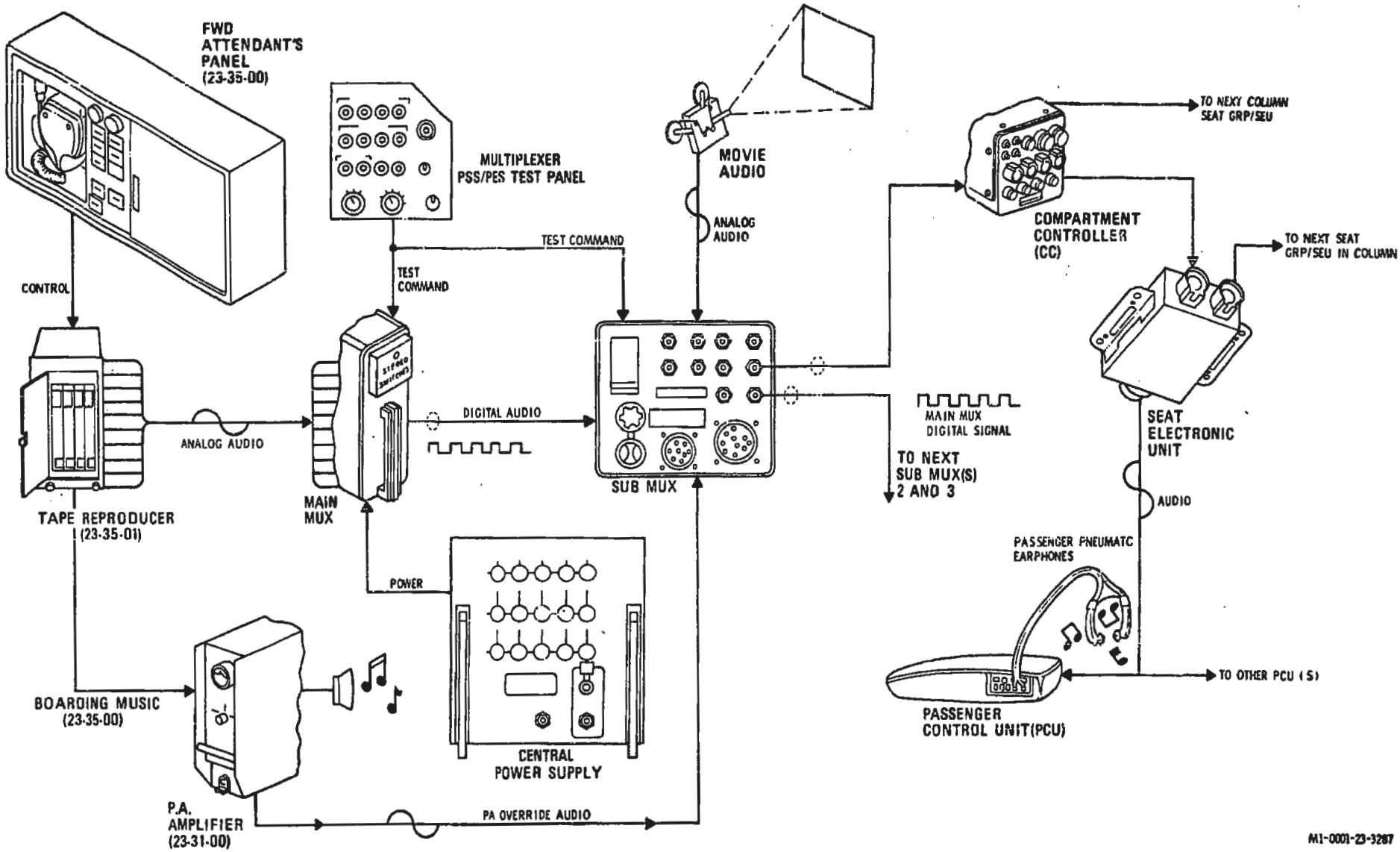
(1) The 115V ac, 400 Hz, three-phase power is supplied to the central power supply from passenger service bus 3 through the POWER SUPPLY - MULTIPLEXED - PASS SERVICE circuit breaker on the galley right circuit breaker panel, zone 130.

(2) The 115V ac, 400Hz, C phase power is supplied to the tape reproducer from the passenger service bus 2 through the AUDIO ENTERTAINMENT - TAPE RPDR circuit breaker on the galley right circuit breaker panel, zone 130.

(3) The 115V ac, 400Hz, C phase power is supplied to the three submultiplexers from passenger service bus 2 through the AUDIO ENTERTAINMENT - SUB MULTIPLEXER - FWD, MID-AFT, and AFT circuit breakers on the galley left circuit breaker panel.

(4) The 28V dc power is supplied to the compartment controllers (CC) from dc bus 3 through the PASSENGER ENTERTAINMENT - MULTIPLEX SYSTEM - circuit breakers on the Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 210.

(5) Multiplex Cutoff Relay, in the energized position, provides three-phase AC power to the PES/PSS power supply from passenger service bus 3R.



PES Intercomponent Audio Data Flow Diagram
Figure 18

R EFFECTIVITY: ALL
R
001B

(6) Submultiplexer Cutoff Relay provides single-phase AC power to each submultiplexer, the four (4) compartment controllers for fan power and the tape reproducer.

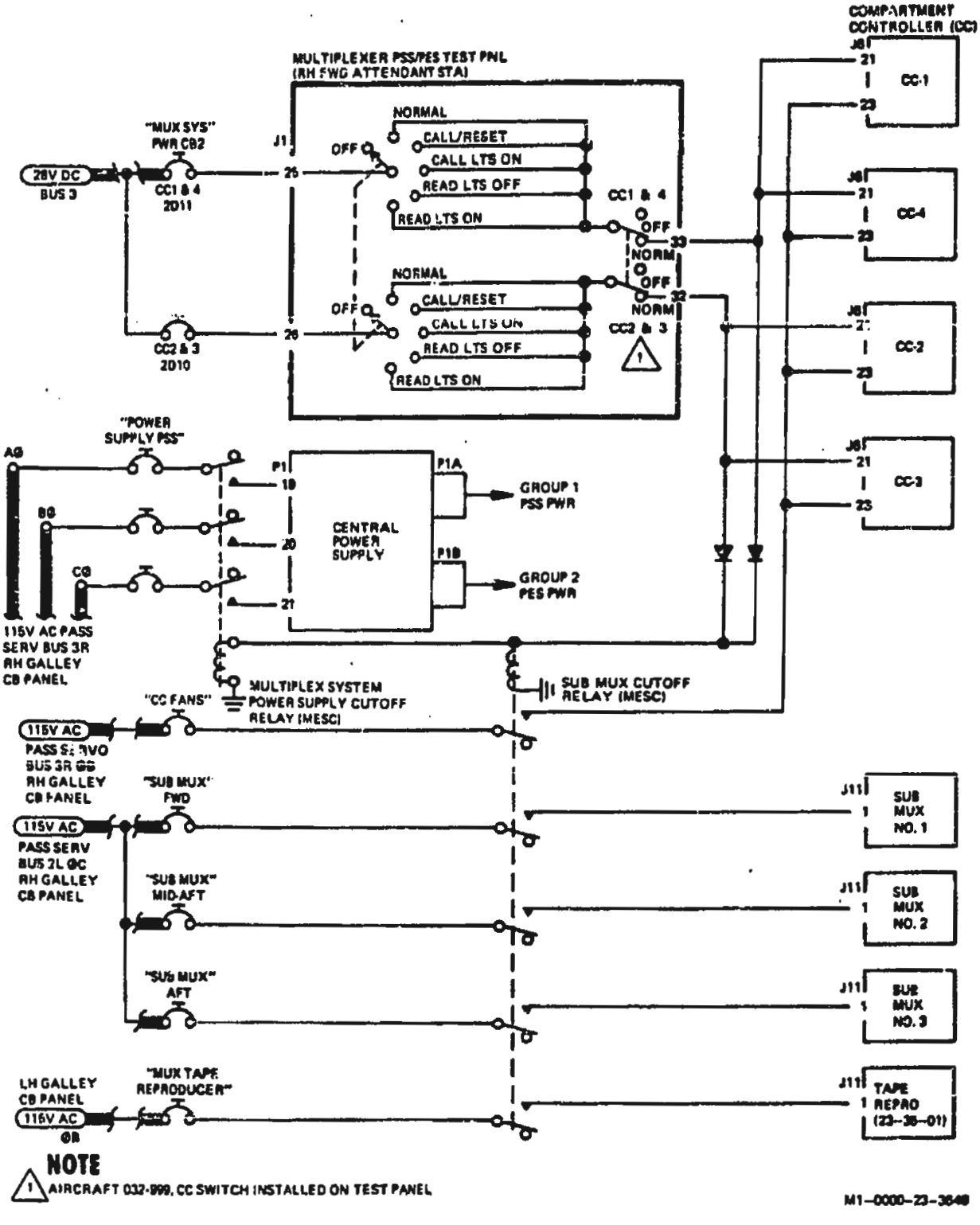
(7) Two MUX SYS PWR circuit breakers provide 28V dc to the MULTIPLEX PSS/PES TEST panel test switch. In any position, except OFF, it provides 28V dc power to the four CCs and to the power cutoff relays for the central power supply and the submultiplexers.

D. PES Components

(1) Passenger Control Unit (PCU) (Ref. 25-21-00) - is mounted in the armrest of each passenger seat. The audio entertainment controls are a rotary 12-position program selector switch, a rotary program volume/balance controls and passenger pneumatic earphone jacks.

(2) Main Multiplexer - (Ref. Fig. 20 and 21) - the main multiplexer is housed in a 1/4 ATR case. The case contains a ventilating hole for unit cooling. An access door on the front panel provides access to five stereo/mono programming switches. A single connector located on the rear panel provides system interface. The main multiplexer is located in the mid electrical service center on the lower shelf of the left rack, zone 137.

The main multiplexer converts 10 audio input channels from the tape reproducer to a form which can be transmitted through a single coaxial cable. The analog audio inputs are converted to binary (digital) representations and multiplexed (time-shared), for transmission through the coaxial cable to the submultiplexers. The analog audio input data is digitized by the pulse code modulation (PCM) technique. In PCM, the amplitude of the analog signal, at any given point, is represented by a 12-bit binary word. The binary words representing the PCM pulses produce a digital pulse train. The multiplexed output is processed through the passenger audio entertainment system and demultiplexed in the seat electronics units. Basic system timing and synchronization is generated by the main multiplexer. The main multiplexer generates timing for 15 channels (although only channels 5 through 14 are used). Channels 1 through 4 are used for visual audio, and channel 15 is used for passenger address (PA) announcements. Channels 1 through 4 and 15 are supplied directly to the submultiplexer. Channel 15 has an extended time period during which the main multiplexer transmits system synchronization data.



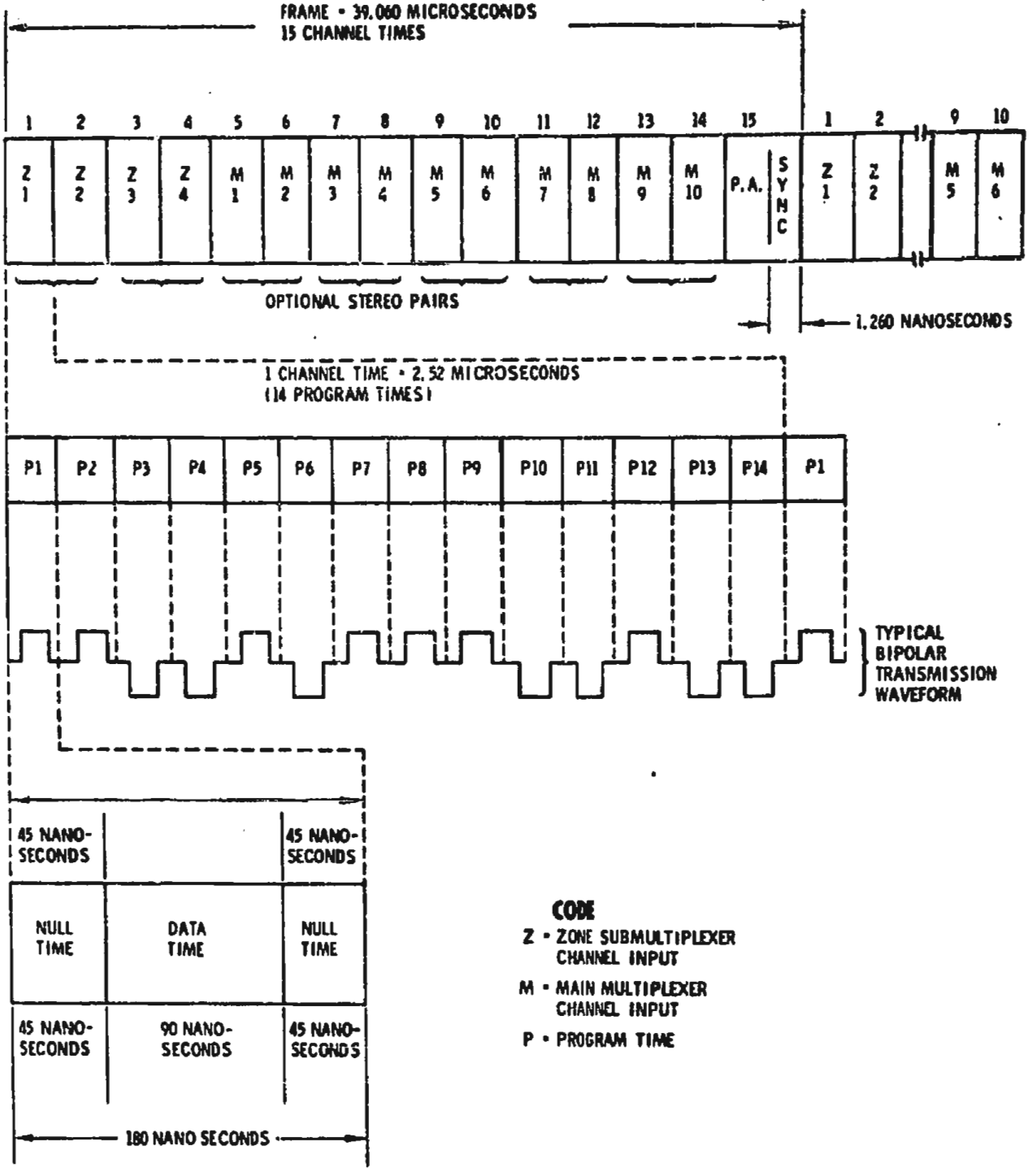
R PES Power Distribution Control Schematic Diagram
R Figure 19

EFFECTIVITY: ALL

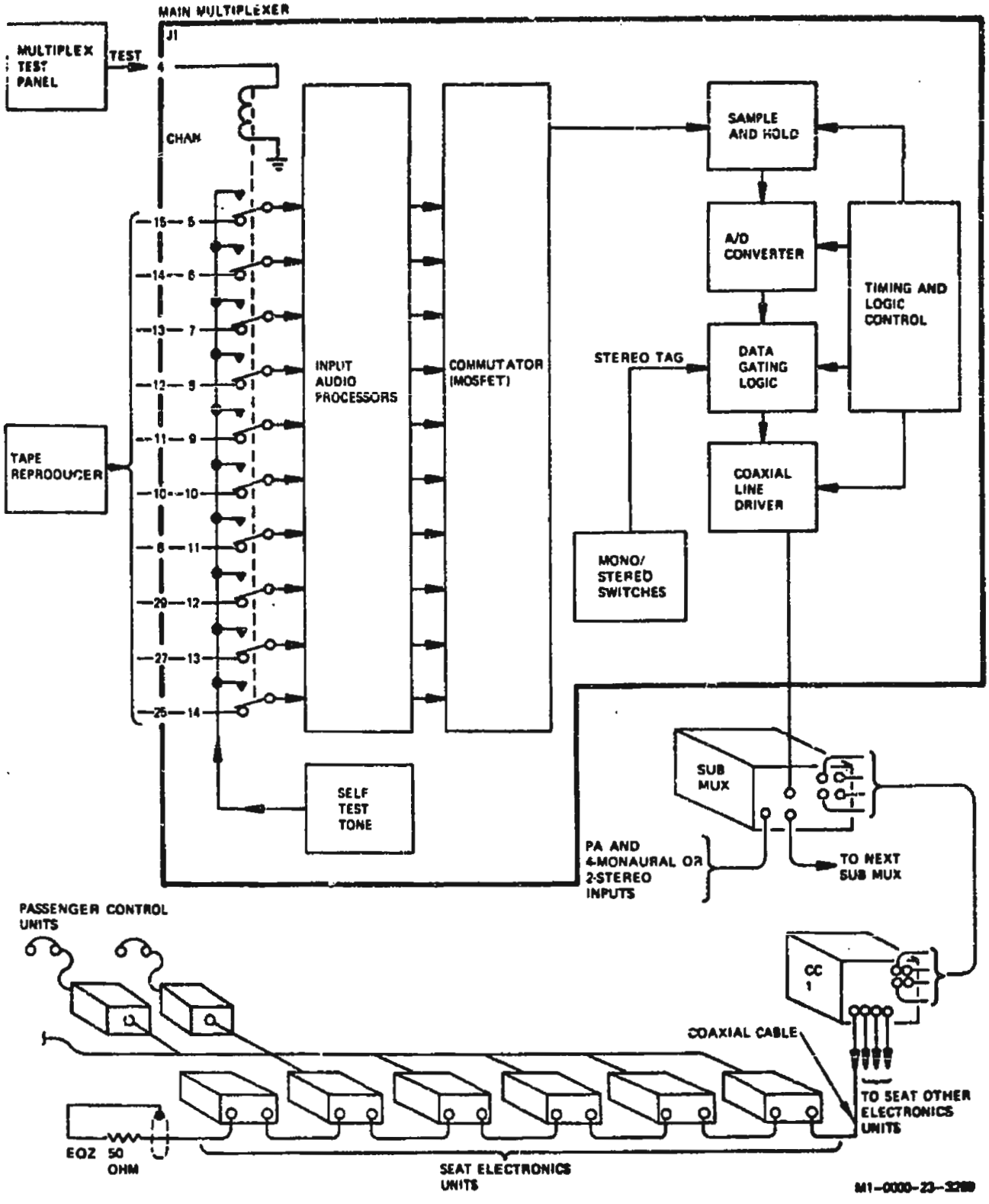
A frame time represents 15 channel times which is equal to the number of inputs to the system. Since the channel times occur sequentially within a frame time and frame time occurs every 39.060 microseconds, each audio input is sampled, converted, and transmitted every 39.060 microseconds. Channel times 5 through 14, designated (main multiplexer channel input) M1 through M10, are allocated to the 10 main multiplexer inputs. During channel times 1 through 4 and 15, designated (submultiplexer) S1 through S4 and P.A., which are allocated to the submultiplexer, the main multiplexer transmits an alternating signal pattern. A channel time is divided into 14 program times designated P1 through P14. Each program time occupies 180 nanoseconds, and the 14 P times represent the digital equivalent of the amplitude and polarity of the sampled audio input. Since the transmission waveform is bipolar, there will always be a 90 nanosecond pulse, either positive or negative, every 180 nanoseconds. During channel 15 time, after P13 time, the main multiplexer produces a pulse pattern that includes a
R null pulse of 180 nanosecond duration. This null pulse is the sync pulse.

(3) Submultiplexer - (Ref. Fig. 22) - the submultiplexer receives 10 channels of digitized audio data from the main multiplexer, reshapes it and transmits it to the compartment controller. Three submultiplexers are installed in the ceiling of the passenger compartments, zones 230, 250, and 270. Submultiplexer No. 1 transmits data through compartment controller No. 1, and submultiplexer No. 2 transmits data through compartment controllers No. 2 and No. 3. Submultiplexer No. 3 transmits data through compartment controller No. 4. Each submultiplexer has eight coaxial outputs. Four of the outputs on submultiplexers No. 1 and No. 3 are spares, submux number 2 uses 8 outputs. Each group of four outputs on the submultiplexers transmit 15 channels of multiplexed audio data through the compartment controllers to each of 4 columns of associated seat electronics units.

The 10 channels of digitized audio data from the main multiplexer are received by each submultiplexer and transmitted to each seat electronics unit through the compartment controllers. In addition, the submultiplexer converts the audio (analog) input of 5 additional channels to digitized audio and multiplexes them with the 10 channels from the main multiplexer. The five additional channels are four channels of audio from the motion picture sound track or tape deck (channels 1 through 4) and audio from the passenger


FRAME • 39.060 MICROSECONDS
15 CHANNEL TIMES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 1 2 9 10
Z1 Z2 Z3 Z4 M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 P.A. SYNC Z1 Z2 M5 M6
OPTIONAL STEREO PAIRS
1,260 NANOSECONDS
1 CHANNEL TIME • 2.52 MICROSECONDS
(14 PROGRAM TIMES)
P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P1
TYPICAL BIPOLAR TRANSMISSION WAVEFORM
45 NANO-SECONDS
45 NANO-SECONDS
NULL TIME
DATA TIME
NULL TIME
45 NANO-SECONDS
90 NANO-SECONDS
45 NANO-SECONDS
180 NANO SECONDS
CODE
Z • ZONE SUBMULTIPLEXER CHANNEL INPUT
M • MAIN MULTIPLEXER CHANNEL INPUT
P • PROGRAM TIME
EM1-0102-23-411

Main Multiplexer Timing and Transmission Format
Figure 20



Main Multiplexer Block Diagram
Figure 21

address line (channel 15). The submultiplexer contains an internal timing circuit so that a failure in the main multiplexer will not disable the operation of channels 1 through 4 and 15.

(4) Seat Electronics Unit - (SEU) - the seat electronics unit provides two interfaces. One is between the passenger control unit and the compartment controller, and the other is between the passenger control unit and the audio demultiplexers. The seat electronics units are located at each seat-group position. The quantity of seat electronics units varies depending on the aircraft seating arrangement (Ref. 25-21-00). Three connectors provide system interface.

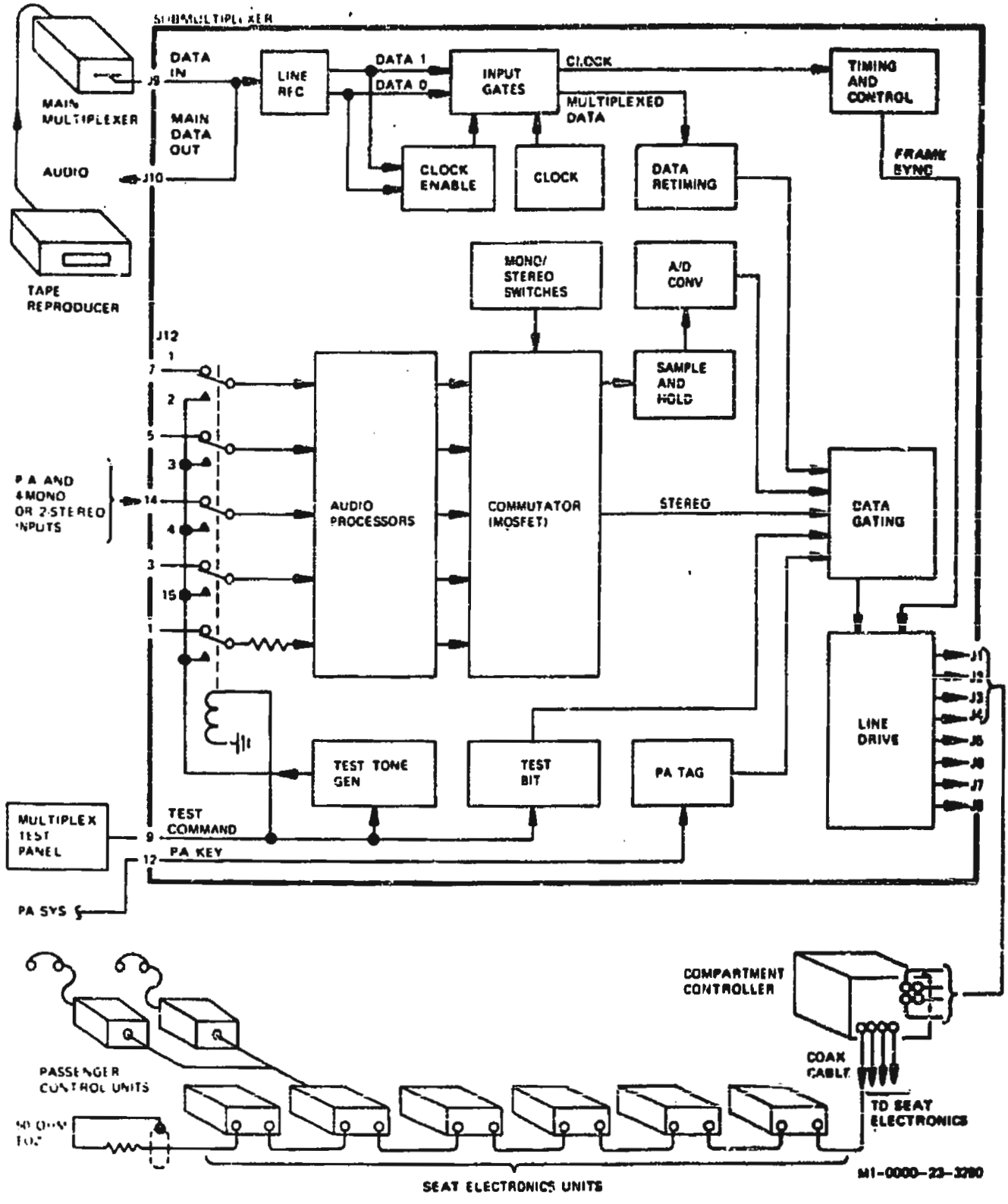
The seat electronics unit receives coded, digital, multiplexed audio voltage levels for each seat PCU within the seat-group serviced. The multiplexed audio data is received from the associated compartment controller and demultiplexed in the seat electronics unit. The program command voltage levels from the PCU are decoded in the seat electronics unit, and the program selected by each passenger is supplied to headphones during the allocated channel time. Logic and timing circuits in the seat electronics units detect and respond to the passenger address control signal and to the stereo control signal. When the passenger address control signal is detected by the seat electronics unit, the passenger address audio overrides all other audio selections and transmissions.

(5) Tape Reproducer

(a) Description

The tape reproducer is housed in a 1/2 ATR short case located in the lower shelf of the left equipment rack in the mid electrical service center (Ref. 23-35-01). The tape reproducer
R consists of the following assemblies: capstan
R motor, 7V dc power supply, two music
R preamplifiers, boarding music preamplifier, remote
R volume control module, 2-4 decoder module, and
R extended play music preamplifier. Remote switches provide ON-OFF operation, channel selection and volume control.

The tape reproducer provides 10 channels of audio (monaural/stereo) to the PES main multiplexer. A channel of boarding music is provided to the passenger address speakers (Ref. 23-36-00).



Submultiplexer Block Diagram
Figure 22

(6) Central Power Supply

The central power supply is a commonly shared unit which provides DC operating power for the passenger audio entertainment and service systems and consists of two separate sections. One section (Group 1 A/B) provides power to seat electronic units, decoders, and compartment controllers. The other section (Group 2) provides DC operating voltages to the main multiplexer.

The power supply can be tested from a TEST switch on the unit front or from the POWER SUPPLY (PWR SUP) TEST switch (A, B) on the MULTIPLEXER PSS/PES TEST panel. These tests only check the Group 1 A and B outputs for
R the passenger service and entertainment systems, but do NOT check the PES Group 2 outputs to the main multiplexer.

(7) PES End-of-Zone Termination Resistors

The seat-to-seat clock/data transmission lines (coaxial cables) are electronically terminated by 50-ohm resistors at the end of each service zone (EOZ) seat group column.

Community 1 EOZ resistors (columns 1, 2, 3, and 4) are an integral part of the seat-to-seat cable terminating the seat group columns.

Community 2 EOZ resistors are located on terminal boards (TB) under the cabin floor:

(a) Service Zone 5 column 1 is on TB9 and column 2 is on TB8,

(b) Service Zone 7 column 1 is on TB13 and column 2 is on TB12,

(c) Service Zone 6 column 3 is on TB7 and column 4 is on TB6,

(d) Service Zone 8 column 3 is on TB11 and column 4 is on TB10,

(e) Terminating resistor for submultiplexer No. 3 is located on TB14, just forward of the submultiplexer.

E. PES Testing and Fault Indicators (Ref. Fig. 23)

Test of the passenger audio entertainment system is controlled from the MULTIPLEXER PSS/PES TEST panel (Ref.

Fig. 4). There are two tests of the PES system; ENTERTAIN/AUD TEST and PA TEST. In ENTERTAIN/AUD TEST, the main and submultiplexers are commanded by the test panel to generate a test tone which the seat electronic units (SEU) should demultiplex. If the SEUs respond correctly, they will indicate so by illuminating the blue row call lights above the passenger seats. In the PA TEST, the ability of each SEU to respond to a PA override command from the PA system (Ref. 23-31-00) is checked.

(1) PES ENTERTAIN/AUD TEST - the MULTIPLEXER PSS/PES TEST panel signal causes the main and submultiplexers to disconnect from their normal audio data inputs and transmit a 1.6kHz test tone (Chs5-14 main mux, Chs1-4 and 15 submux; the submux also adds the test instruction bit P2 in Ch 2). The data, containing 15 monaural channels of 1.6kHz each and the test bit, are applied to the coaxial line and to each seat electronics unit. The test bit causes the SEU to switch to test mode and pass the test tone through its demultiplexing network and into the passenger control unit (PCU) audio transducer. The test tone, as demultiplexed by the SEU, must meet two requirements; first it must be at least 12 volts pk-pk, and second it must be approximately 1.6kHz in frequency. In addition, the PCU audio volume control and transducer must not be shorted or open, as they are the load for the SEU circuit and will cause a test failure if defective. If all the foregoing requirements are met, the PSS section of the SEU will respond with a blue row call light on signal to the overhead decoder to turn on the blue row call light in the passenger service module.

PES test is performed by the area submultiplexers generating test instructions to all SEUs. The PSS system is simultaneously instructed to monitor the SEUs for entertainment test results. CC-1 collects the test results and displays failures on SERVICE ZONE,
R MULTIPLEXER (MAIN/SUB), and SEAT UNIT lights.

R (2) PA TEST - This test method verifies the PA override function. The test functions the same as the ENTERTAIN/AUD TEST with one addition, the PA override tag bit (P1) is also transmitted by the submultiplexers and if the SEUs are operating correctly, they will respond by ignoring the test tone on all channels except 15. Because the channel 15 test tone is allowed to pass through an attenuating resistor, the signal voltage level will be less than the 12 volts pk-pk required for the SEU to pass the test. The result will

be that each SEU will report a test failure and the blue row call lights will go out.

CR F. Nine Abreast Multiplexing Installation

CR (1) Changes to Multiplexing System

CR (a) New coach seats are being installed on the 1011 aircraft. Seating is in a 9 abreast 2-5-2 arrangement; that is, double seats at both outboard positions and a quint (5 place seat assembly) in the center. The first class area is rearranged but the same seats are reused. Multiplexing-wise, the outboard doubles operate the same as before except that there are a few more of them.

CR (b) Multiplexing-wise, the center quint acts as a triple (on the left) and a double (on the right). The three passengers on the left have control units connected through a triple seat harness to a triple seat electronics unit (SEU). Overhead, a triple multiplexing decoder operates a passenger service module (PSM) which has a third reading light added. The right two passengers on the center quint have their control units connected through a double seat harness to a double seat electronics unit (SEU). Overhead are a double multiplexer decoder and a double PSM, like before.

CR (c) Center quads (4 place seats) are used in the last three rows of the aircraft where the quints would be too wide. These quads act like two doubles, like before, with double multiplexing units.

CR (d) New passenger control units (PCU's) are installed in the new coach seats. Channel select and volume controls are the same as before and are obvious. The reading light control slides down for ON, up for OFF. Attendant call control slides down for call, and up for reset. The individual air outlet (IAO) control slides up or down to step the air valve into its next position. There may be some confusion regarding the IAO control because a two position switch (up or down) controls a three position air valve (off, low, and high). Obviously there can be no correlation between switch position and air valve position.

CR (e) PCU removal is done by loosening a small screw in the aft end of the PCU. Loosening the screw will loosen a dog which holds the PCU in place. After

CR a few turns of the screw, the dog will swing free
CR and a resistance will be felt. At that point DO
CR NOT loosen the screw any more; pull the aft end of
CR the PCU out and the rest is obvious.
CR Reinstallation is just the opposite and is
CR obvious.

CR (f) Left hand PCU's are used on the left side of
CR passengers; right hand PCU's are used on the right
CR side of passengers. The transducer is always on
CR the forward end of the PCU. Part numbers are
CR shown at the end of this temporary revision.

CR (g) Triple multiplexing units MUST be used for triple
CR positions (the L H side of the quint seats;
CR 23/plane domestic or 25/plane international), and
CR double multiplexing units MUST be used at all
CR other locations. Double and triple multiplexing
CR units have been intermixed in the past but they
CR are being installed in their proper places as the
CR aircraft are modified for 9 abreast; double and
CR triple multiplexing units are NOT to be intermixed
CR on aircraft with the 9 abreast seats.

CR (h) A third reading light is being added to column 2
CR PSM's above the quint seats. It is located on the
CR forward hinged panel of the PSM and is referred to
CR as the No. 3 reading light on the PSM.
CR Originally, No. 1 reading light was the forward
CR light and No. 2 was the aft light. Now we have
CR No. 3, 1 and 2, going front to back.

CR (j) For reading light test, it was necessary to jumper
CR the control circuits for reading light No. 1 and 3
CR together. As a result, No. 3 reading light will
CR come on with No. 1 when indicating an oxygen
CR generator fault. As before, reading light No. 1
CR indicates any oxygen generator fault and No. 2
CR reading light indicates a door latch (solenoid)
CR fault. The only difference is that when No. 1
CR comes ON, No. 3 will come ON with it.

CR NOTE: No other changes were made in the operation
CR or in the testing system.

CR (k) No changes were made in the individual air outlets
CR (IAO). The four outlets cover the quint seat by
CR having the second and third (from the left)
CR passengers (seat numbers X-4 and X-5) share the
CR number 2 outlet on column 2 PSM. The outlet is
CR aimed between these two seats and the Decoder is
CR wired so that the air valve will advance if either

C of the passengers operates the air control. The
C division line between multiplexing communities 1
C and 2 is between seat rows 20 and 21 on both
C domestic and international configurations.

NOTE: Additional oxygen masks are provided for
R the extra seats.

(3) PES Fault Indicator Lights - the MULTIPLEXER PSS/PES TEST panel (Ref. Fig. 4) contains several fault indicator lights to monitor the operational status of the PES components. Operation of the fault indicator lights is controlled by compartment controller 1 (CC1), except for the POWER SUPPLY light.

(a) SERVICE ZONE Lights

These lights have dual functions. With both test selector switches in NORMAL, they monitor PSS timing errors (data shift or open loop).

With the PSS test selector switch in NORM and either ENTERTAIN/AUD or PA TEST selected at the PES Entertainment selector switch, they identify entertainment failures in their respective areas.

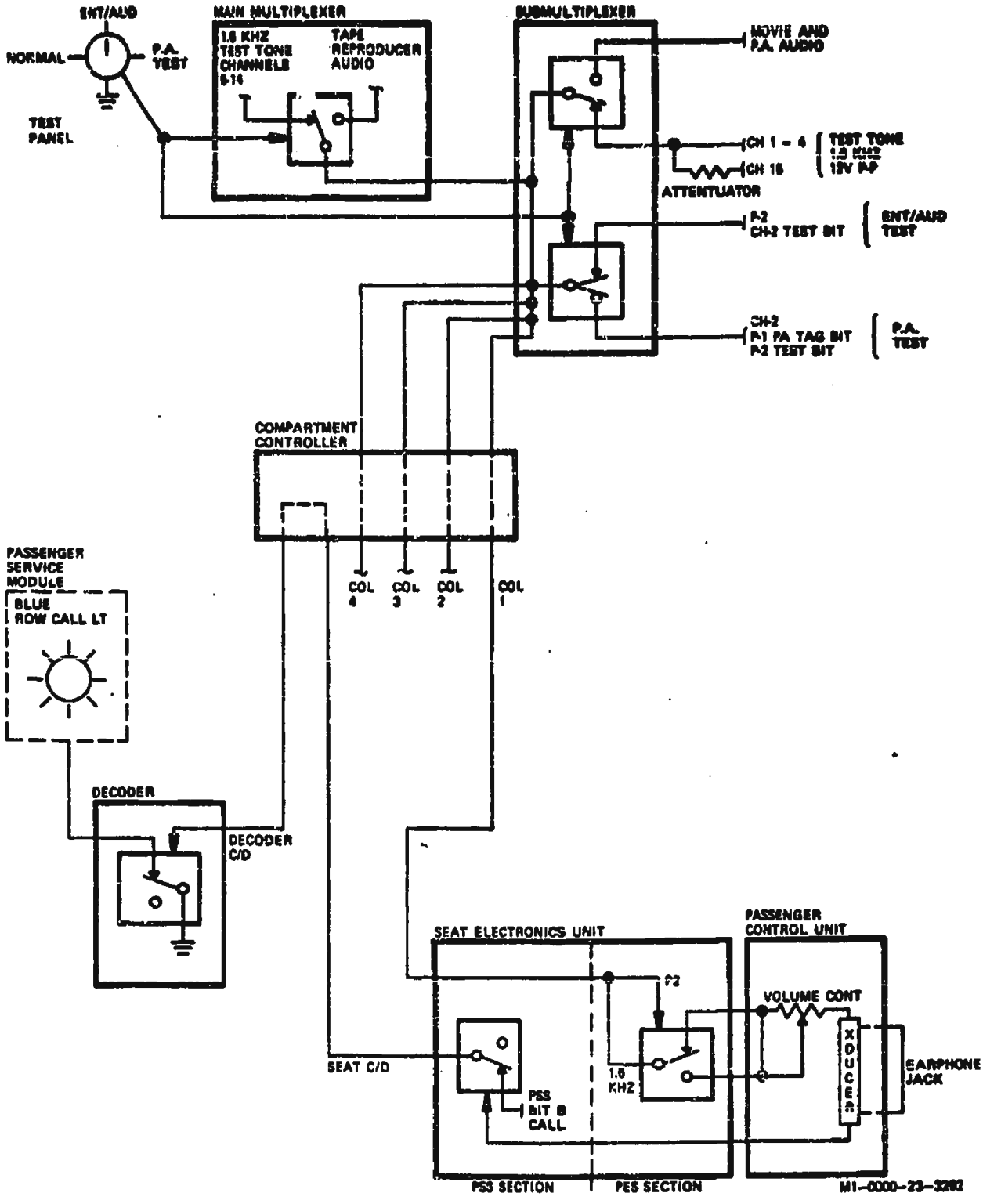
In either PSS NORM or PES TEST operation, an illuminated SERVICE ZONE light indicates at least one failure within two zones (e.g., SERVICE ZONE 1 and 3 indicates a problem in column 1 or 2 from the L1 entry door to the community divide).

Any single failure within a zone causes its respective SERVICE ZONE light to illuminate, but ADDITIONAL FAILURES in that zone will not be annunciated until the first problem has been cleared.

(b) MULTIPLEXER - MAIN, SUB and SEAT UNIT

These lights are only operational when the PES test selector switch is in the ENTERTAIN/AUD TEST or PA TEST position. The lights are only used to indicate problems in the PES system.

PES test is performed by the area submultiplexers generating test instructions to all SEUs. The PSS system is simultaneously instructed to monitor the SEUs for entertainment test results. CC-1 collects the test results and displays failures on SERVICE ZONE, MULTIPLEXER (MAIN/SUB) and SEAT UNIT lights.



PES Test Functions Block Diagram
Figure 23

PASSENGER SERVICE AND ENTERTAINMENT (AUDIO) SYSTEMS FAULT ISOLATION

1. General

The passenger audio entertainment system (PES) and the passenger service system (PSS) fault isolation diagrams and procedures in this section can be used for fault isolation any time a fault is reported or suspected. Before fault isolation is started, the PREREQUISITES listed on each diagram and in Paragraph 3C should be reviewed and performed.

If the flight crew reports a trouble using a FIRM Fault Code number, the number can be found in the FIRM Fault Code Cross Reference Table in the Chapter 23-INDEX.

The FIRM Fault Code Cross Reference Table includes the flight report (fault symptoms) and the exact Section, Figure and Sheet where fault isolation should begin. Refer to the L-1011 Maintenance Manual Introduction for a more detailed explanation of the use of fault isolation diagrams.

If a fault is reported or suspected and no FIRM Fault Code is available, the function or fault indication can be found in Table 101. When a diagram is selected in this manner, fault isolation must be started at Block 1.

Since no fault isolation reporting system can cover every failure symptom, supplemental fault isolation data are provided (Ref. Paragraph 3) in the form of system operational data, troubleshooting notes/key points [necessary in isolating troubles between the two multiplex systems (PSS/PES)], system testing data and system functional schematics which provide information for intercomponent signal tracing from source to termination.

R To troubleshoot aircraft wiring, refer to Wiring Manual Diagram Cross Reference (WM DIA CROSS REF) tables on the system functional schematics, which list the applicable wiring diagram in the L1011 Wiring Diagram Manual.

2. Fault Isolation/Identification

Table 101 is a list of PSS/PES fault isolation diagrams and schematics in this section. Figures 101 and 102 provide PSS/PES component location.

TABLE 101

	FIGURE	TITLE
	101	Component Location Index
	102	Component Locator Diagram
	103	PES/PSS Fault Isolation Tests
	104	COMPARTMENT CONTROLLER Fault Light on
	105	READ LT ON Test Failure
	106	READ LT OFF Test Failure
	107	CALL LT ON Test Failure (Call Lights Out)
	108	CALL LT ON Test Failure (High Chimes Do Not Operate)
	109	CALL/RESET (off) Test Failure
	110	PSS/PES POWER SUPPLY (A/B) Test Failure
	111	ENTERTAIN TEST Failure
	112	MAIN MULTIPLEXER Fail Light on
	113	PA TEST Failure
	114	Different Audio Each Ear
	115	Flashing Reading Lights/Cycling Air Valves.
	116	No Audio Entertainment and/or Boarding Music
	117	Ranging (Random-Ringing) Chimes and Flashing Call Lights
	118	High Chimes Do Not Operate
R	119	Audio Noisy/Distorted (PES)
	SCHEM 1	PSS/PES Power Distribution Schematic Diagram
	SCHEM 2	PSS Functional Schematic Diagram
	SCHEM 3	PES Functional Schematic Diagram

COMPONENT	QTY	ACCESS/AREA	REFERENCE
COMPARTMENT CONTROLLER	4	ABOVE CEILING PANEL	23-33-05
DECODER	⚠1	OVERHEAD CEILING PANEL	23-33-06
PASSENGER SERVICE MODULE	⚠1	OVER SEAT GROUP	25-21-00
SEAT ELECTRONICS UNIT	⚠1	UNDER SEAT GROUP	23-33-04
PASSENGER CONTROL UNIT	⚠1	EACH SEAT/GROUP	25-21-00
CENTRAL POWER SUPPLY	1	MESC, LH RACK	23-33-08
TAPE REPRODUCER	1	MESC, LH RACK	23-35-01
MAIN MULTIPLEXER	1	MESC, LH RACK	23-33-02
SUBMULTIPLEXER	3	ABOVE CEILING PANEL	23-33-03
MULTIPLEXER PSS/PES TEST PANEL	1	RH FWD ATTENDANT STATION	23-33-09

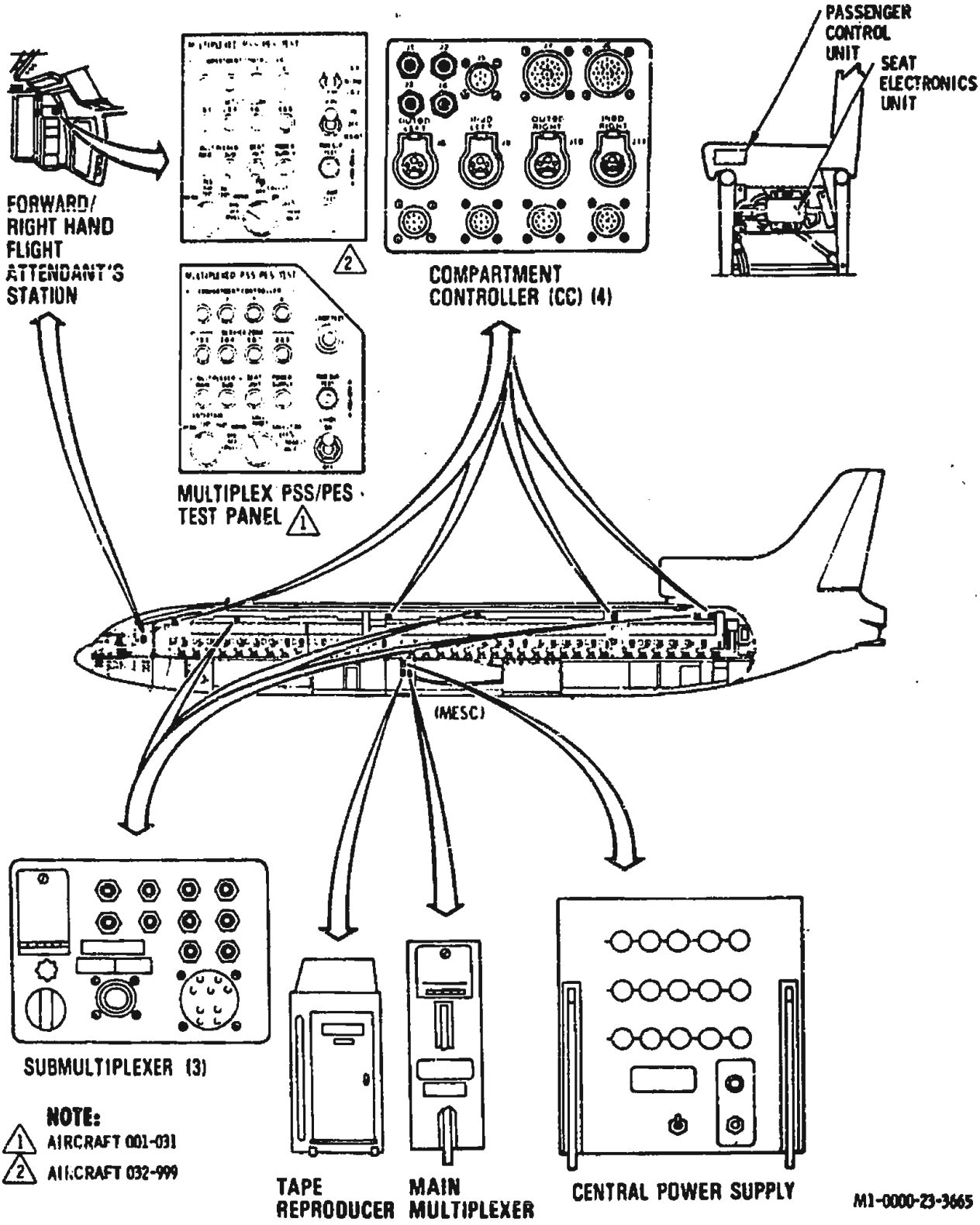
NOTE
⚠1 COMPONENT QTY VARIES WITH SEAT CONFIGURATION

M1-0001-23-3316

R
R PSS/PES Component Location Index
Figure 101

EFFECTIVITY: ALL

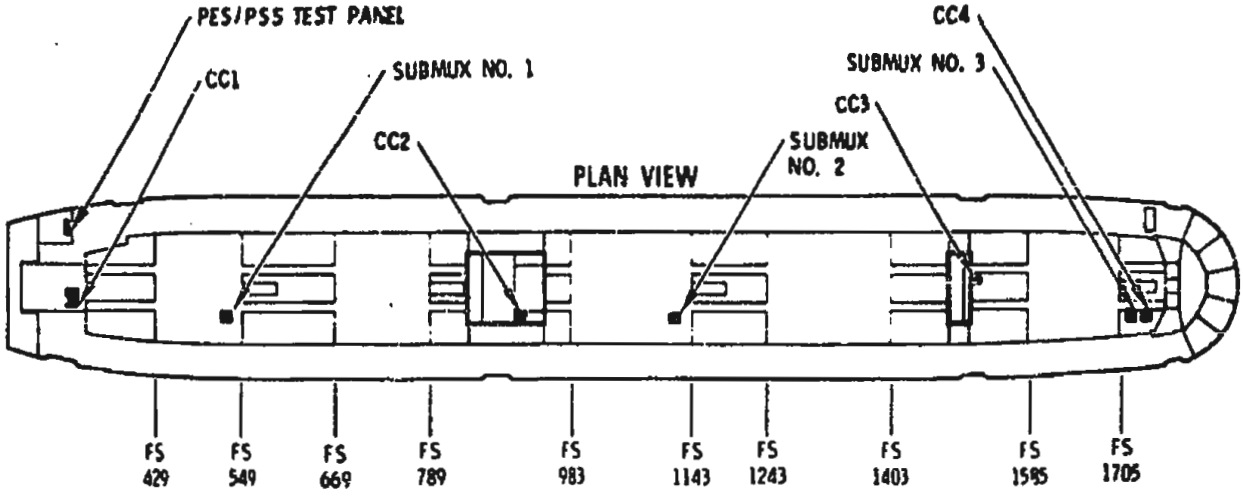
005B

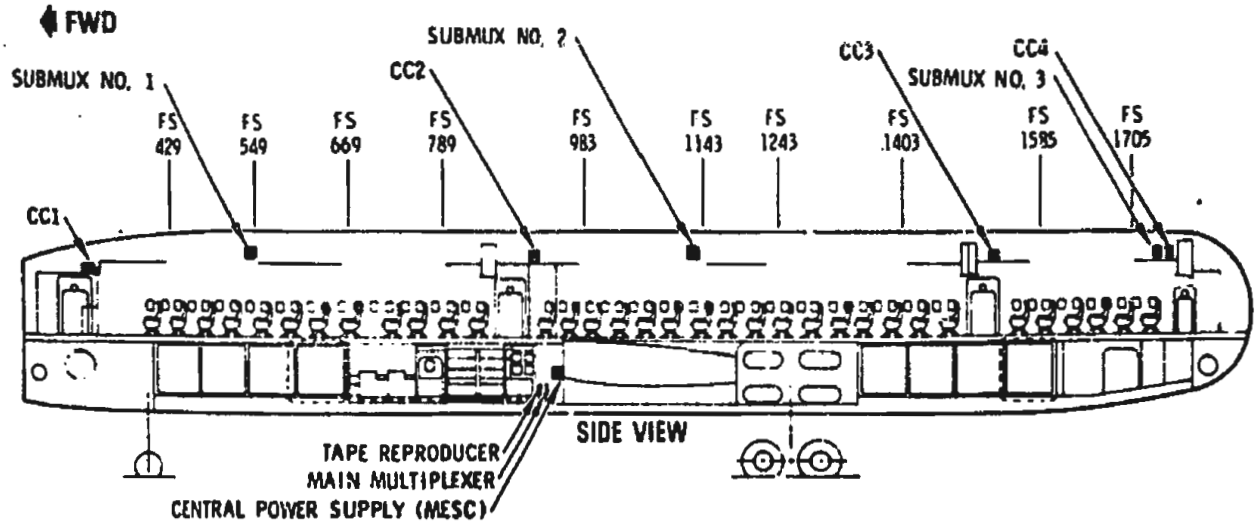


R PES Component Locator Diagram
R Figure 102 (Sheet 1)

EFFECTIVITY: ALL

005B



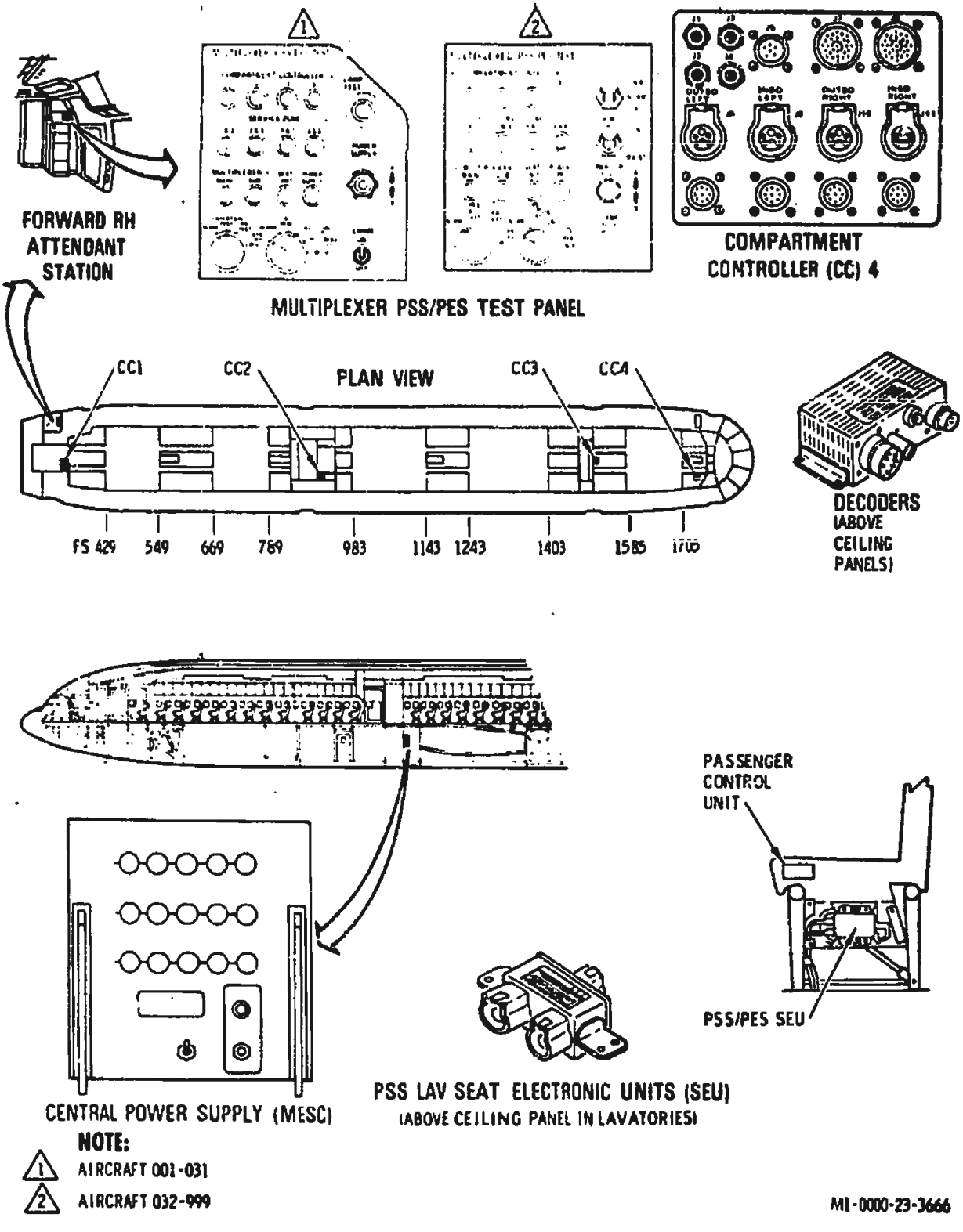


M1-0000-23-3384

R PES Component Locator Diagram
R Figure 102 (Sheet 2)

EFFECTIVITY: ALL

005B



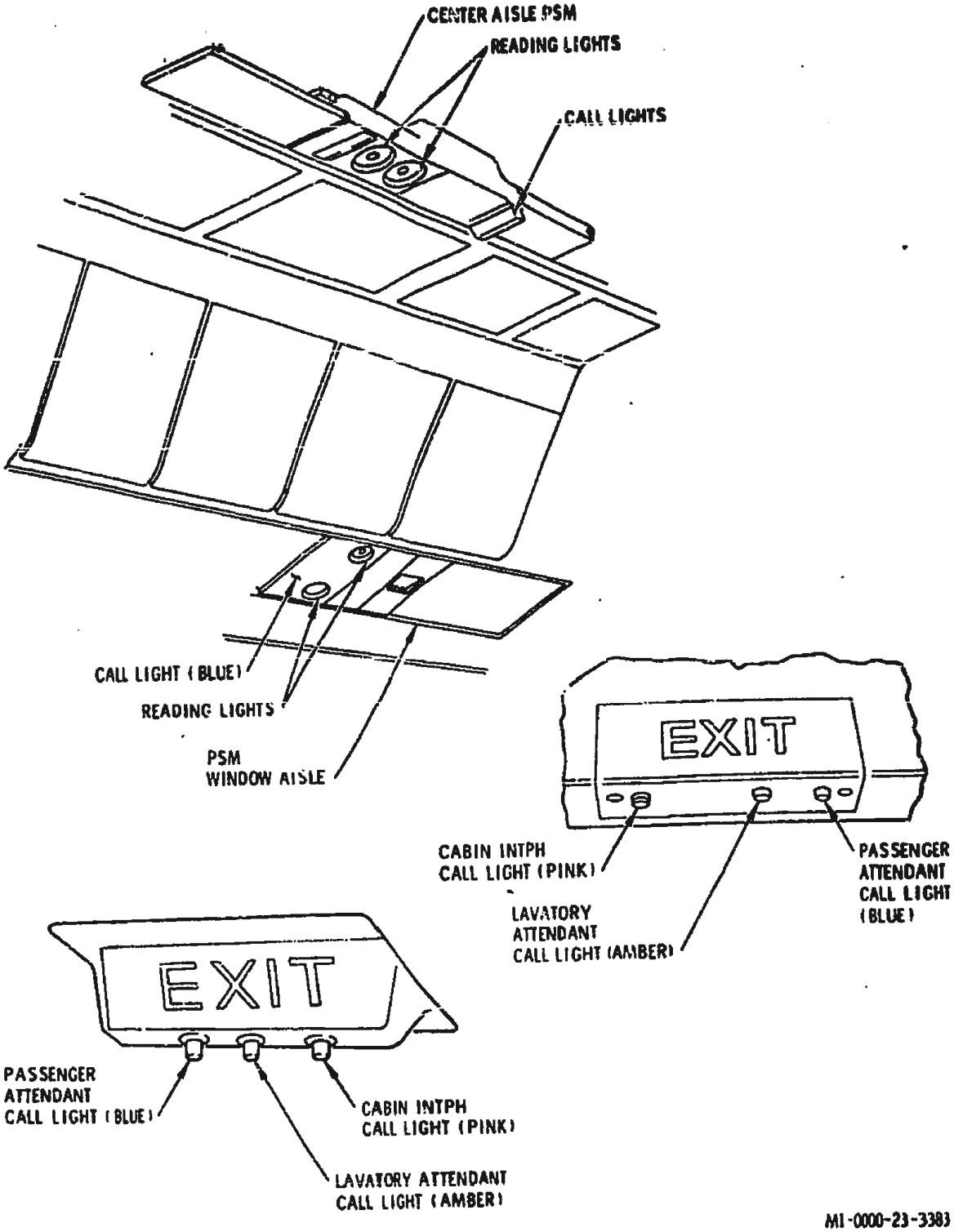
NOTE:

1. AIRCRAFT 001-031
2. AIRCRAFT 032-999

M1-0000-23-3666

R PSS Component Locator Diagram
R Figure 102 (Sheet 3)

EFFECTIVITY: ALL

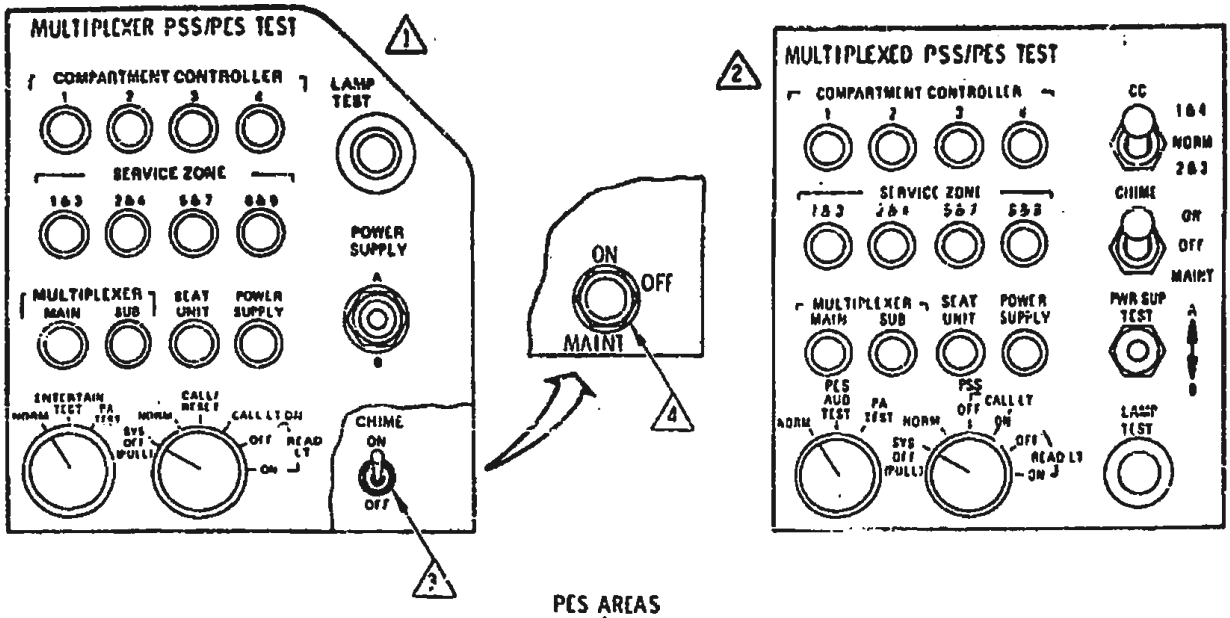


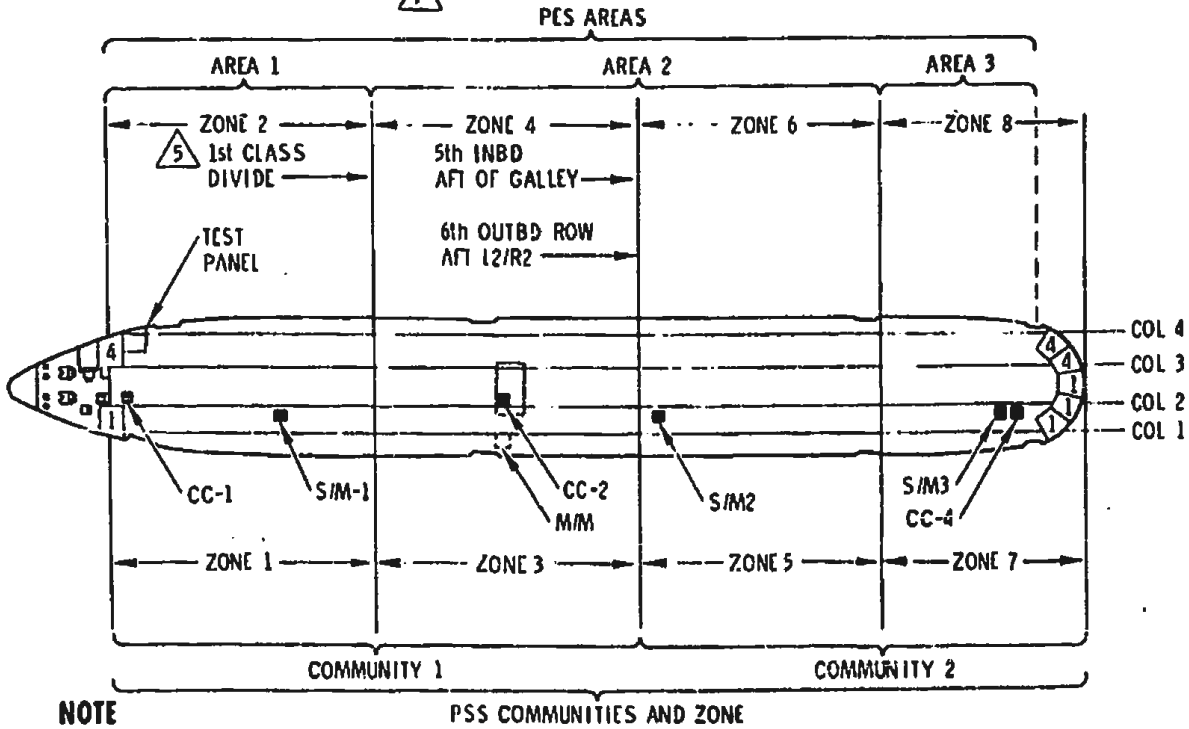
MI-0000-23-3383

R PSS Component Locator Diagram
R Figure 102 (Sheet 4)

EFFECTIVITY: ALL

005B





PSS COMMUNITIES AND ZONE

NOTE

1. AIRCRAFT 001-031
2. AIRCRAFT 032-999
3. AIRCRAFT WITHOUT SB23-030 INCORPORATED
4. AIRCRAFT WITH SB23-030 INCORPORATED
5. VARIES WITH SEATING CONFIGURATION

M1-0001-23-3667

R PSS/PES Test Panel and Service Areas/Zones
R Component Locator Diagram
R Figure 102 (Sheet 5)

EFFECTIVITY: ALL

005B

3. PSS/PES Supplemental Fault Isolation Data

A. General

Effective troubleshooting of the multiplex (PSS/PES) systems is dependent upon PROPER INTERPRETATION of the MULTIPLEXER PSS/PES TEST Panel indications and the use of its test functions. Paragraph E, which provides a review of these indications and test functions, should be referred to before troubleshooting the multiplex systems.

The term "Multiplex System" actually refers to two separate systems:

- The Passenger Service System (PSS)
- The Passenger Entertainment System (PES)

Except for some commonly shared components, the two systems are independent of each other, and therefore are tested separately.

B. Aircraft Communities and Columns, PSS Zones and PES Areas (Ref. Fig. 103)

The aircraft is divided into columns, communities, zones, and areas for the Passenger Service and Passenger Entertainment Systems as follows:

(1) Passenger Service

Four longitudinal seat-group columns - Forward lavatories 1 and 2 are extensions of columns 1 and 4 respectively. Aft lavatories 1, 2 and 3 are extensions of column 1, and aft lavatories 4 and 5 are extensions of column 4.

Community 1 and Community 2 - Community division occurs at five seat rows aft of the mid service center on columns 2 and 3, and six seat rows aft of columns 1 and 4 (division depends upon aircraft seating configuration). Each community is normally served by two compartment controllers (CC), but one CC in each community will maintain satisfactory operation.

Each community is divided into four service zones. First class division occurs at the first class cabin divider, or aft of the tenth row of seats in aircraft without a cabin class divider.

(2) Passenger Entertainment

Three entertainment (forward, mid, aft) areas, each area is served by an area submultiplexer. The Main Multiplexer is common to all three PES areas.

C. PSS/PES Testing/Fault Isolation Prerequisites

Before performing checks/fault isolation on the Passenger Service or Entertainment Systems, check the following circuit breakers:

(1) FE/SO CB2 Panel

CB2 C8 HOST ADVSY IND

CB2 D10 MULTIPLEX SYS CC1, 4

CB2 D11 MULTIPLEX SYS CC2, 3

(2) Galley Left CB Panel

PASS SVCE MDLE CBs

TAPE RPDR

SUB MULTIPLEXER FWD, MID AFT, and AFT

(3) Galley Right CB Panel

POWER SUPPLY MULTIPLEXED PASS SVCE

COMPT CONT FANS

(4) MESC LH RACK - MUX SYS PWR supply unit CB1 POWER

D. The central power supply should be checked as follows:

(1) At the Test Panel or at the power supply itself (MESC), place the test switch to position A and then to B. The green light should illuminate at each position.

(2) If CB1 on the central power supply is tripped, both tests will fail and the CC1 fault light on the MUX Test Panel will illuminate.

NOTE: • Ignore any SERVICE ZONE fault indications during these tests. Remember that the power supply test checks Group 1 A and B outputs for passenger service and entertainment. It does NOT check the Group 2 outputs for the main multiplexer.

• CB2 D10 circuit breaker not installed on some

aircraft.

• Aircraft with prerecorded announcements have two ac CBs labelled TAPE RPDR PRERCD BOARDING MUSIC and MUX, and one dc CB labelled CONT TAPE RPDR PRERECORDED.

E. PSS/PES Fault Isolation Keypoints/Reminders

(1) First determine if the problem is of PSS or PES origin.

(2) Compartment controller CC1 operates the MULTIPLEXER PSS/PES TEST panel. If CC1 fails, do not use the panel.

(3) The Test Panel can only annunciate failures of PSS or PES, but not both at the same time. Test Panel switch position determines which types of failures are communicated.

(4) SERVICE ZONE fault lights annunciate PSS failures ONLY, when both test panel selector switches are in NORM.

(5) SERVICE ZONE fault lights will not show a change in status unless the PSS selector switch is in NORM.

(6) A shorted SEU or decoder will cause shifted PSS operation of that column fore or aft, depending on the direction of CC transmission. The column will go into one-way operation, and the associated SERVICE ZONE fault lights will illuminate.

(7) MULTIPLEXER; MAIN, and SUB, and SEAT UNIT lights annunciate PES faults, but only when the PES selector switch is in ENTERTAIN/AUD TEST.

(8) A shorted/stuck Passenger Address hand mic causes all entertainment and boarding music in the aircraft to be inoperative.

(9) Remove power before replacing components by placing the PSS selector switch to SYS OFF.

F. PSS/PES Fault Isolation Using MULTIPLEXER PSS/PES TEST Panel

(1) General

The MULTIPLEXER PSS/PES TEST panel (Ref. Fig. 103) includes several indicator lights to identify the operational status of the PSS and PES systems. Operation of all fault indicator lights except POWER SUPPLY is controlled through CC1.

Two test selector switches enable the PSS and PES systems to be operated normally or in test modes for fault isolation checks. A POWER SUPPLY test switch enables checking of the power supply. Indicator lamp validity may be checked by operation of the LAMP TEST switch. A CHIME ON-OFF switch enables passenger/attendant chimes to be turned off.

On aircraft 001-017 modified by SB23-030 (R2) and aircraft 018-999, the MULTIPLEXED PSS/PES TEST panel CHIME control switch has a MAINT position and an internal dual chime inhibit module.

With the switch in the ON position, the chime signal is routed through the dual chime inhibit module where it is passed uninhibited provided the module has not processed a chime signal in the previous 4 seconds. In the event of ranging chimes, the inhibit module will temporarily cure the problem by not processing the chime signal if it has sensed a previous signal within the 4 second time span. The inhibit module is bypassed with the switch in the MAINT position, allowing the "ranging chime" malfunction to be heard by the maintenance personnel.

On aircraft 032-999,
the test panel contains a CC control switch, three position, (NORM, CC1&4 and CC2&3) which provides operational modes for one-way SEU interrogation during maintenance troubleshooting tasks.

(2) Component Fail Indicator Lights

(a) COMPARTMENT CONTROLLER (CC)

These lights illuminate to identify a faulty CC. They operate independently of either test selector switch. Each CC continuously reports its operational status to CC1 (parity), which in turn controls the four CC lights.

If any CC light illuminates, complete testing of both PSS/PES is not possible, but some limited system testing may be performed.

If the COMPARTMENT CONTROLLER 1 fault light illuminates, no systems testing should be performed with the MULTIPLEXER PSS/PES TEST panel controls until the CC1 fault has been cleared.

If the PSS test selector switch is in a test position, CCs are operating in other than a normal

transmission mode. Hence, if a COMPARTMENT CONTROLLER fault light illuminates during a test, the suspected CC fault should be verified by briefly removing power (selector switch to SYS OFF) and then returning the system to NORM. Any CC light remaining illuminated indicates a real CC failed annunciation.

SERVICE ZONE lights of zones (1 & 3, 2 & 4, 5 & 7, 6 & 8) affected by a failed CC will also illuminate.

(b) SERVICE ZONE

SERVICE ZONE lights have dual functions.

With both test panel selector switches in NORM, the lights monitor PSS timing errors (data shift or open loop).

With the PSS test selector switch in NORM, and the PES selector switch in either TEST or PA TEST the lights identify entertainment failures in their respective areas.

By using the test panel selector switches and observing Passenger Reading and Attendant blue call light functions, fault isolation down to individual SEU/decoder problems can be obtained.

In either PSS NORM or PES test operation, an illuminated ZONE light indicates at least one failure within two zones (e.g., SERVICE ZONE 1 & 3 light indicates a problem in column 1 or 2 from the L1 entry door to the community divide).

Any single failure within a zone causes its respective SERVICE ZONE light to illuminate, but additional failures in that zone will not be annunciated until the first problem has been cleared.

If a SERVICE ZONE light was on when the PSS selector switch was in NORM, it will remain on if the selector switch is moved to a test position, and it will not change status even if the problem is removed. Similarly, if a problem develops when the PSS selector switch is in a test position, that problem will go unreported, and its respective SERVICE ZONE light will remain extinguished until the PSS selector switch can be returned to NORM.

SERVICE ZONE lights can be ignored during PSS test modes. Passenger reading lights and Attendant blue call lights are used as individual test annunciators during these tests.

(c) MULTIPLEXER - MAIN/SUB and SEAT UNIT

These three lights are only operational when the PES test selector switch is in the ENTERTAIN/AUD TEST or PA TEST position. The lights are only used to indicate problems in the PES system.

PES test is performed by the area submultiplexers generating test instructions to all SEUs. The PSS system is simultaneously instructed to monitor the SEUs for PES test results. CC1 collects the test results and displays failures by illuminating the SERVICE ZONE, MULTIPLEXER, and SEAT UNIT lights.

An illuminated SEAT UNIT light with the PES selector at ENTERTAIN/AUD TEST indicates that AT LEAST ONE PES failure has occurred in SEUs or PCUs.

NOTE: Illuminated MAIN and SUB lights are NOT NECESSARILY FACTUAL indications of failed main or submultiplexers.

Main and Submultiplexer failures are deduced as follows:

SUB Mux Fail. Counts the number of reported SEU failures in particular service areas. If at least one failure in FOUR DIFFERENT ROWS within an area is reported, CC1 will assume that the failures were caused by the submultiplexer failing to provide the correct test signals, and hence, that the SEUs in that area are reporting individual failures.9 The SUB light will illuminate if the submultiplexer fails OR if there are SEU failures in all four rows in that area.

MAIN Mux Fail. This light will illuminate if CC1 detects a submultiplexer failure in BOTH communities, the reason being that only the main multiplexer is common to both communities. Hence, a Submux fail in both communities is most likely caused by an improper output from the main mux. However, two other conditions will cause the MAIN mux fail light to illuminate: Submux 1 and Submux 3 both failed; and Submux 2 failed, since this unit supplies signals to Area 2, which is in both

communities and hence would be seen as two Submux failures by CCI.

Whenever a MAIN mux failure is detected, the SUB mux fail light is inhibited.

When the PES test selector switch is in ENTERTAIN/AUD TEST, the SERVICE ZONE lights will unlatch any PSS failures they may have been reporting, and will now report PES failures from the three PES areas (Area 1 = PSS zones 1 and 2; Area 2 = PSS zones, 3, 4, 5 and 6; Area 3 = PSS zones 7 and 8).

(d) POWER SUPPLY (PWR SUP TEST). This light illuminates when the POWER SUPPLY test switch is placed in position A or B to indicate a good A or B section of the power supply.

(3) PSS/PES Test Selections

(a) PSS selector switch position SYS OFF, deenergizes two relays which remove DC power from PSS and PES components and AC power from the compartment controller (CC) fan circuits and submultiplexers.

NOTE: AC power is not removed from overhead decoders, but the selector switch should be placed to SYS OFF when any PSS/PES component is to be disconnected or connected.

(b) NORM position, PSS system is in normal two-way interrogation and is monitoring the seat and decoder clock/data lines for timing errors. Malfunctions will be displayed on the SERVICE ZONE fault lights. The COMPARTMENT CONTROLLER (CC) fault lights are operational and will display failure of any of the CCs.

NOTE: In the following test positions of the PSS selector switch, the SERVICE ZONE lights are latched up to their last condition and will not respond to changes in status. The COMPARTMENT CONTROLLER fault lights are not directly affected by selector switch modes and should indicate valid CC status whether the system is in Test or NORM.

(c) READ LT ON. The purpose of this test is to determine if a decoder will correctly respond to a passenger service request. While only the reading

light function of the decoder is tested, it is assumed that if a decoder can properly carry out a reading light command, it can also perform its attendant call and cool air valve functions. In this test, the CCs are directly communicating with all overhead decoders. The reading light control switch in the passenger control unit (PCU) will have no control over its reading light during test. During this test (and all others), normal two-way interrogation is interrupted and the PSS system enters ONE-WAY transmission. In READ LT ON test and all other On tests (CALL LT ON, ENTERTAIN/AUD TEST, and Oxygen Test), CC1 only transmits in Community 1, and CC4 only transmits in Community 2. The READ LT ON test proves the following:

The decoder will respond to a service request.

The decoder will pass clock/data to the next (upstream) decoder (indicating there is no open decoder or cable).

Comm line 1 is good (test command from CC1 to CC4 is transmitted on Comm line 1).

NOTE: All reading lights in the aircraft, and the blue test lamps on the attendant and lavatory oxygen modules, should be on. These PSS tests are tests of SEUs and decoders, not Passenger Service Module (PSM) reading lights or call lights. In fact, a satisfactory PSS test can be performed even if the PSMs are not connected. Therefore, before replacing PSS components (SEU/decoders) ensure that the lamp bulbs are good.

(d) READ LT OFF. In this test, CC2 transmits in Community 1, and CC3 transmits in Community 2. CC1 being the test originator, it sends the test commands to CC2 and 3 via Comm line 4. This test proves the following:

The decoder will respond to an OFF command.

The decoder will pass clock/data to the next decoder. (The direction of transmission is opposite of READ LT ON test.)

Comm line 4 is good.

(e) CALL LT ON. This test is a specific check of SEUs. In this test, the CCs will communicate with the SEUs and request an attendant call. The CCs are, in effect, electronically pulling all passenger call buttons. If the SEUs respond properly, each seat will generate an ALL CALL and cause the blue attendant light above each seat to illuminate. This test proves the following:

The SEU will transmit service commands.

The SEU will pass clock to the next seat-group SEU.

Comm line 1 is good.

On aircraft 032-999, the test call function is ANDed with the read light, causing the read light (as well as the call light) to go on during the CALL LT ON Test. This is a feature of the improved System 7 SEU and may be used to identify these units if retrofitted onto aircraft 001-031.

(f) CALL/RESET (OFF). In this test, CC2 transmits in Community 1, and CC3 transmits in Community 2. All blue attendant call lights should extinguish. This test proves the following:

The SEU can cancel an attendant call.

The SEU will pass clock to the next seat-group SEU (transmission direction is opposite of CALL LT ON).

Comm line 4 is good.

(g) PES Selector Switch, this switch allows the PES system to function in its normal operating mode, permits checks to be carried out on the demultiplexing PES circuits of each SEU, or may be used to verify the PA override function of each SEU. The NORM position is operating position for the PES functions.

(h) ENTERTAIN TEST, this test causes the main multiplexer (mux) to generate a multiplexed test tone on each of its ten channels, and the three submuxs to generate a multiplexed test tone on each of their five channels. Each submux also generates a test instruction that causes each SEU within the respective submux areas to go into the

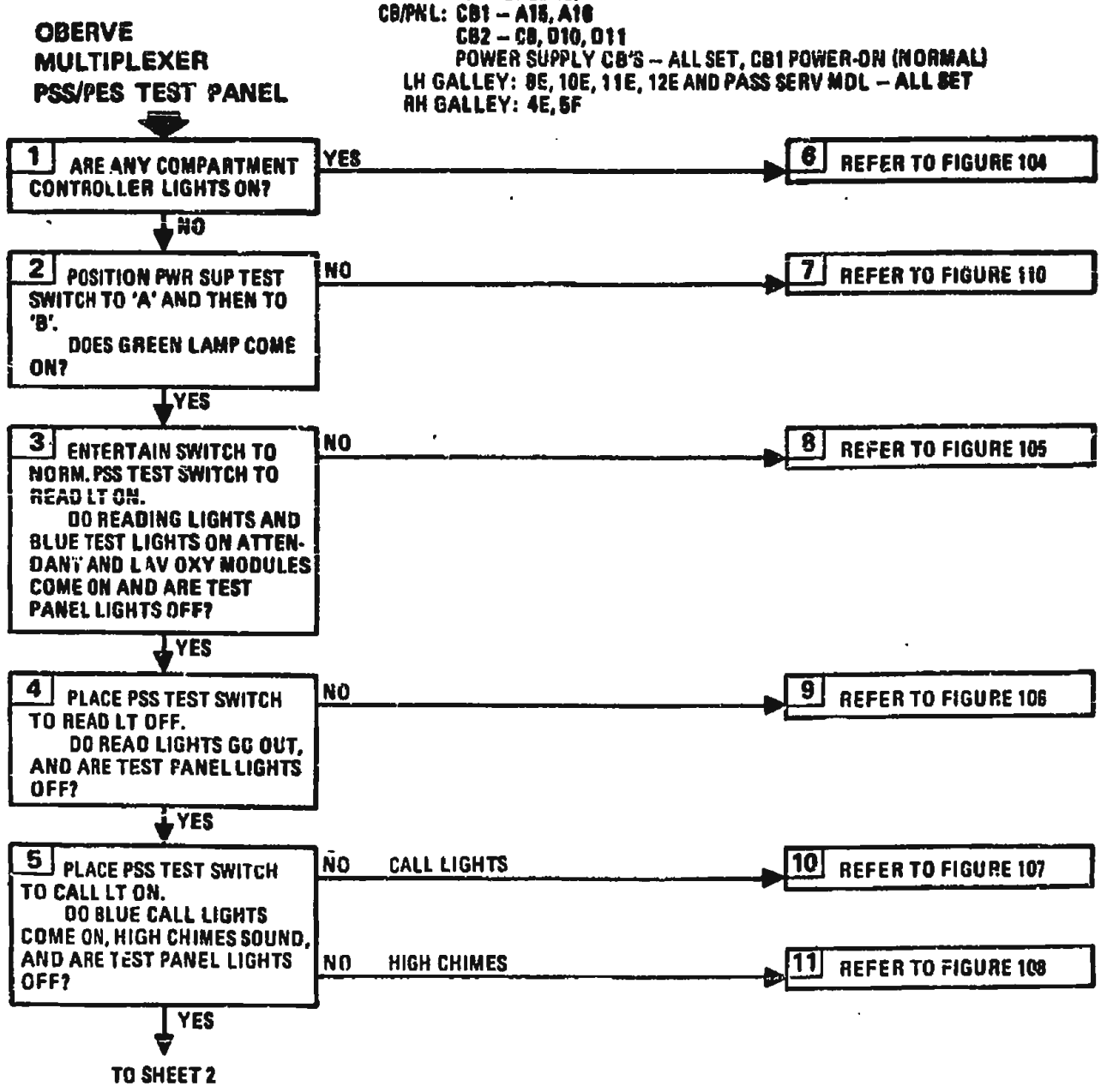
test mode of operation. The test tone is of a specific frequency and amplitude, and if the SEUs are operating correctly, their demultiplexing circuits will generate a signal proportional to the test tone frequency and amplitude. These signals are sent through the volume/tone/balance controls and each transducer in the seat-group PCUs, and detected by the test modules in the SEUs. The outputs of the test modules are applied to the PSS circuits in the SEUs, and if the demultiplexing circuits of the SEUs are functioning correctly, the attendant call lights above the seats will illuminate. If an SEU fails, the call light above the seat will not illuminate. During this test, the audio test tone can be heard at each seat PCU, and it is possible for the test tone to be present at the seat but have that seat reporting at failure. This is usually due to a failure of the SEU PES test module. Under these circumstances, the seat will operate properly for normal use, but will indicate a failed test.

NOTE: At the same time that the PES is in TEST, so is the PSS system. This causes CC1 to unlatch any PSS failures being displayed on the SERVICE ZONE lights and will now display any PES area failures.

(i) PA TEST. This test is essentially the same as ENTERTAIN TEST, with slight modification. The test tone and test instruction are still applied to each SEU, but in addition, a PA override signal is generated, and the level of the PA channel (Channel 15) test tone is reduced in the submuxs to a point which will not satisfy the SEU test module requirements. The level of the signals in Channels 1 to 14 is not reduced. The PA override command should cause each SEU to bypass its channel select circuitry and, rather than apply the channel selected at its PCU, it should apply the PA channel test signal to the test module. Because of the reduced amplitude of the PA signal, the test module should report a PES failure resulting in the attendant call light for that seat extinguishing. This proves that the SEU will respond to PA override signals because of the reported PES failure. Had the SEU not responded to the override command, the test module would have continued to receive the high-level test tone in Channels 1 through 14 and would not have reported a failure. Therefore, a satisfactory PA test results in all blue attendant call lights

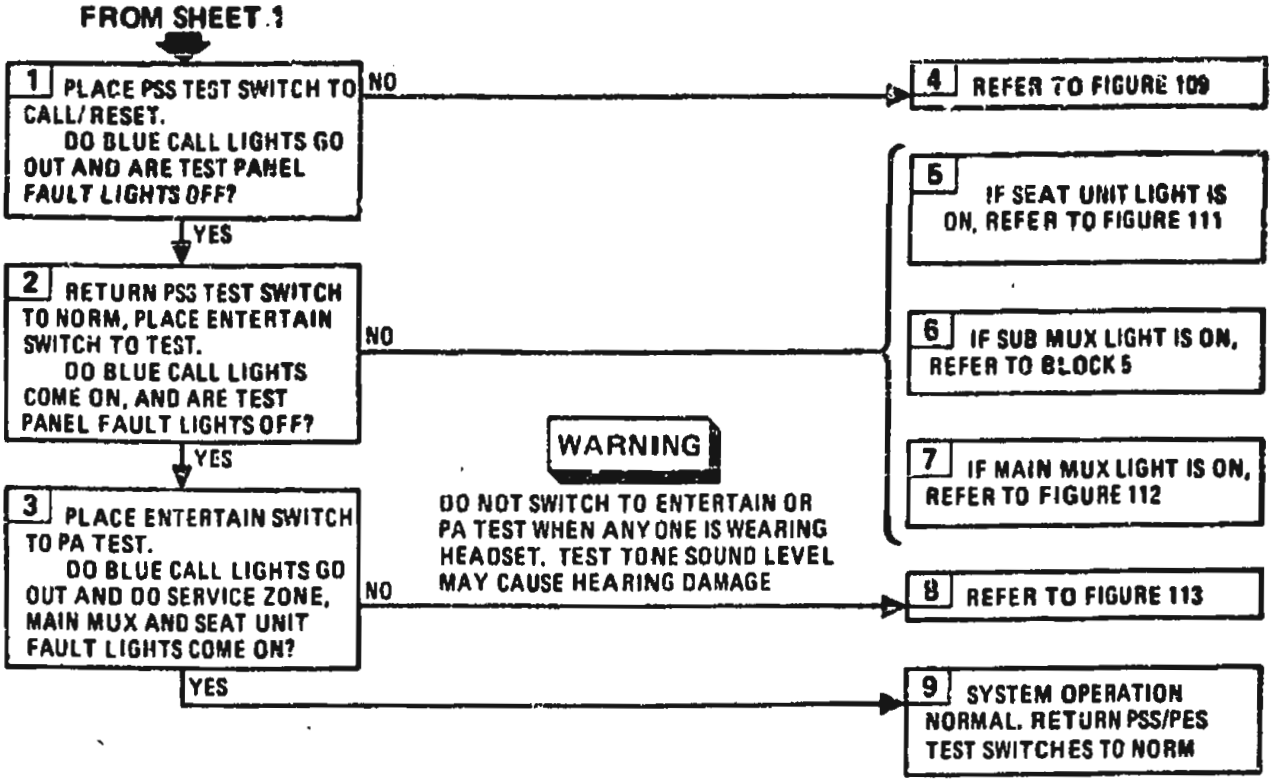
extinguishing and the following lights on the test panel illuminating: all four SERVICE ZONE lights, MAIN MULTIPLEXER (SUB light inhibited) and SEAT UNIT lights.

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
COOLING (MM21-26-00)
CB/PNL: CB1 – A15, A16
CB2 – C8, D10, D11
POWER SUPPLY CB'S – ALL SET, CB1 POWER-ON (NORMAL)
LH GALLEY: 8E, 10E, 11E, 12E AND PASS SERV MDL – ALL SET
RH GALLEY: 4E, 5F


OBERVE MULTIPLEXER PSS/PES TEST PANEL
1 ARE ANY COMPARTMENT CONTROLLER LIGHTS ON?
YES
6 REFER TO FIGURE 104
NO
2 POSITION PWR SUP TEST SWITCH TO 'A' AND THEN TO 'B'. DOES GREEN LAMP COME ON?
NO
7 REFER TO FIGURE 110
YES
3 ENTERTAIN SWITCH TO NORM. PSS TEST SWITCH TO READ LT ON. DO READING LIGHTS AND BLUE TEST LIGHTS ON ATTENDANT AND LAV OXY MODULES COME ON AND ARE TEST PANEL LIGHTS OFF?
NO
8 REFER TO FIGURE 105
YES
4 PLACE PSS TEST SWITCH TO READ LT OFF. DO READ LIGHTS GO OUT, AND ARE TEST PANEL LIGHTS OFF?
NO
9 REFER TO FIGURE 106
YES
5 PLACE PSS TEST SWITCH TO CALL LT ON. DO BLUE CALL LIGHTS COME ON, HIGH CHIMES SOUND, AND ARE TEST PANEL LIGHTS OFF?
NO CALL LIGHTS
10 REFER TO FIGURE 107
NO HIGH CHIMES
11 REFER TO FIGURE 108
YES
TO SHEET 2

M1–0001–23–3318

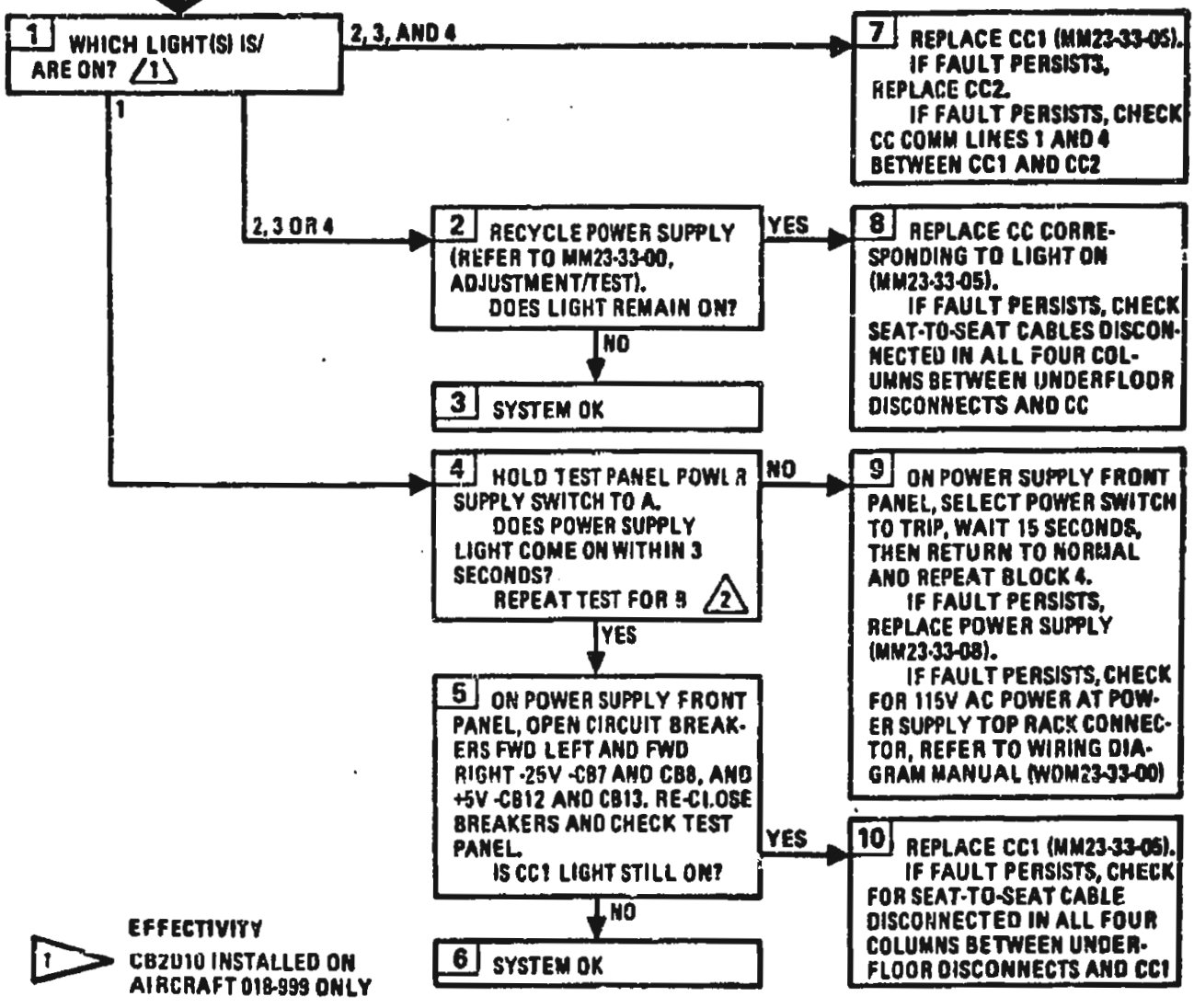
PES/PSS Fault Isolation Tests
Figure 103 (Sheet 1)


FROM SHEET 1
1 PLACE PSS TEST SWITCH TO CALL/RESET.
DO BLUE CALL LIGHTS GO OUT AND ARE TEST PANEL FAULT LIGHTS OFF?
NO
4 REFER TO FIGURE 109
YES
2 RETURN PSS TEST SWITCH TO NORM, PLACE ENTERTAIN SWITCH TO TEST.
DO BLUE CALL LIGHTS COME ON, AND ARE TEST PANEL FAULT LIGHTS OFF?
NO
5 IF SEAT UNIT LIGHT IS ON, REFER TO FIGURE 111
6 IF SUB MUX LIGHT IS ON, REFER TO BLOCK 5
7 IF MAIN MUX LIGHT IS ON, REFER TO FIGURE 112
YES
WARNING
DO NOT SWITCH TO ENTERTAIN OR PA TEST WHEN ANY ONE IS WEARING HEADSET. TEST TONE SOUND LEVEL MAY CAUSE HEARING DAMAGE
3 PLACE ENTERTAIN SWITCH TO PA TEST.
DO BLUE CALL LIGHTS GO OUT AND DO SERVICE ZONE, MAIN MUX AND SEAT UNIT FAULT LIGHTS COME ON?
NO
8 REFER TO FIGURE 113
YES
9 SYSTEM OPERATION NORMAL. RETURN PSS/PES TEST SWITCHES TO NORM

M1-0001-23-3319

PES/PSS Fault Isolation Tests
Figure 103 (Sheet 2)

PREREQUISITES
ELEC POWER (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB's IN: 2C8, 1 > 2D10, 2D11
RH GALLEY PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
LH GALLEY PANEL: POWER–PASS. SERV MDL – CB's SET
POWER SUPPLY FRONT PANEL, CB's CLOSED AND POWER CB1 SWITCH IN NORMAL
TEST PANEL SERVICE AND ENTERTAIN SWITCHES IN NORM
DEPRESS LAMP TEST SWITCH AND VERIFY ALL LIGHTS COME ON


COMPARTMENT CONTROLLER (CC) LIGHT(S) ON
1 WHICH LIGHT(S) IS/ ARE ON? 1
2, 3, AND 4
7 REPLACE CC1 (MM23-33-05). IF FAULT PERSISTS, REPLACE CC2. IF FAULT PERSISTS, CHECK CC COMM LINES 1 AND 4 BETWEEN CC1 AND CC2
1
2, 3 OR 4
2 RECYCLE POWER SUPPLY (REFER TO MM23-33-00, ADJUSTMENT/TEST). DOES LIGHT REMAIN ON?
YES
8 REPLACE CC CORRESPONDING TO LIGHT ON (MM23-33-05). IF FAULT PERSISTS, CHECK SEAT-TO-SEAT CABLES DISCONNECTED IN ALL FOUR COLUMNS BETWEEN UNDERFLOOR DISCONNECTS AND CC
NO
3 SYSTEM OK
4 HOLD TEST PANEL POWER SUPPLY SWITCH TO A. DOES POWER SUPPLY LIGHT COME ON WITHIN 3 SECONDS? REPEAT TEST FOR B 2
NO
9 ON POWER SUPPLY FRONT PANEL, SELECT POWER SWITCH TO TRIP, WAIT 15 SECONDS, THEN RETURN TO NORMAL AND REPEAT BLOCK 4. IF FAULT PERSISTS, REPLACE POWER SUPPLY (MM23-33-08). IF FAULT PERSISTS, CHECK FOR 115V AC POWER AT POWER SUPPLY TOP RACK CONNECTOR, REFER TO WIRING DIAGRAM MANUAL (WDM23-33-00)
YES
5 ON POWER SUPPLY FRONT PANEL, OPEN CIRCUIT BREAKERS FWD LEFT AND FWD RIGHT -25V -CB7 AND CB8, AND +5V -CB12 AND CB13. RE-CLOSE BREAKERS AND CHECK TEST PANEL. IS CC1 LIGHT STILL ON?
YES
10 REPLACE CC1 (MM23-33-05). IF FAULT PERSISTS, CHECK FOR SEAT-TO-SEAT CABLE DISCONNECTED IN ALL FOUR COLUMNS BETWEEN UNDERFLOOR DISCONNECTS AND CC1
NO
6 SYSTEM OK
EFFECTIVITY
1 CB2D10 INSTALLED ON AIRCRAFT 018-999 ONLY

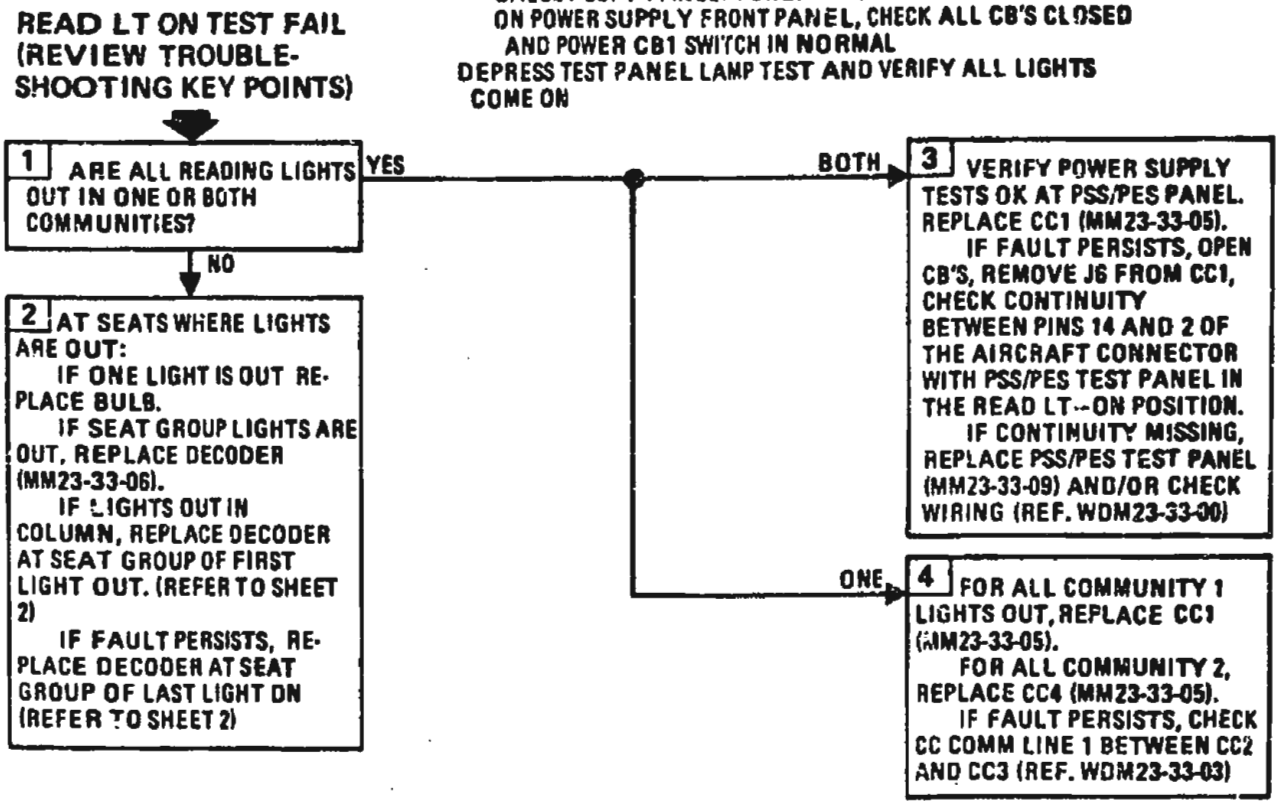
NOTE
1 SERVICE ZONE LIGHTS MAY BE ON WITH COMPARTMENT CONTROLLER LIGHT
2 SERVICE ZONE LIGHTS MAY COME ON DURING POWER SUPPLY TEST. IF LIGHTS GO OFF WITHIN 15 SECONDS AFTER TEST IS COMPLETED, DISREGARD

M1–0000–23–3321

COMPARTMENT CONTROLLER Fault Light On
Figure 104

PREREQUISITES

ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER-PASS. SERV MDL – ALL CB'S
ON POWER SUPPLY FRONT PANEL, CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL
DEPRESS TEST PANEL LAMP TEST AND VERIFY ALL LIGHTS COME ON

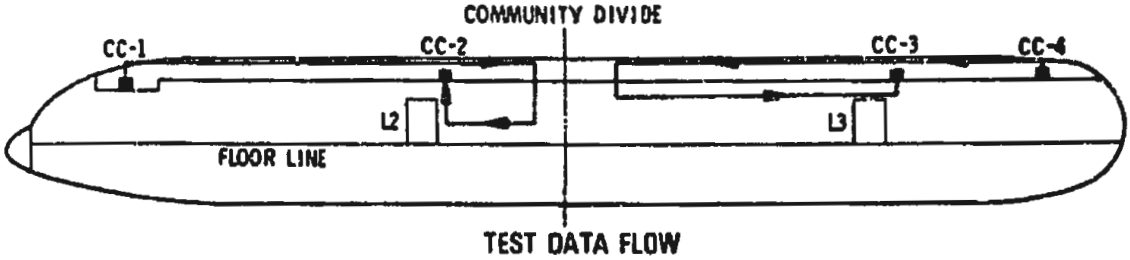

READ LT ON TEST FAIL (REVIEW TROUBLE-SHOOTING KEY POINTS)
1 ARE ALL READING LIGHTS OUT IN ONE OR BOTH COMMUNITIES?
YES
NO
BOTH
ONE
2 AT SEATS WHERE LIGHTS ARE OUT:
IF ONE LIGHT IS OUT REPLACE BULB.
IF SEAT GROUP LIGHTS ARE OUT, REPLACE DECODER (MM23-33-06).
IF LIGHTS OUT IN COLUMN, REPLACE DECODER AT SEAT GROUP OF FIRST LIGHT OUT. (REFER TO SHEET 2)
IF FAULT PERSISTS, REPLACE DECODER AT SEAT GROUP OF LAST LIGHT ON (REFER TO SHEET 2)
3 VERIFY POWER SUPPLY TESTS OK AT PSS/PES PANEL. REPLACE CC1 (MM23-33-05).
IF FAULT PERSISTS, OPEN CB'S, REMOVE J6 FROM CC1, CHECK CONTINUITY BETWEEN PINS 14 AND 2 OF THE AIRCRAFT CONNECTOR WITH PSS/PES TEST PANEL IN THE READ LT--ON POSITION.
IF CONTINUITY MISSING, REPLACE PSS/PES TEST PANEL (MM23-33-09) AND/OR CHECK WIRING (REF. WDM23-33-00)
4 FOR ALL COMMUNITY 1 LIGHTS OUT, REPLACE CC1 (MM23-33-05).
FOR ALL COMMUNITY 2, REPLACE CC4 (MM23-33-05).
IF FAULT PERSISTS, CHECK CC COMM LINE 1 BETWEEN CC2 AND CC3 (REF. WDM23-33-03)

TROUBLESHOOTING KEY POINTS:

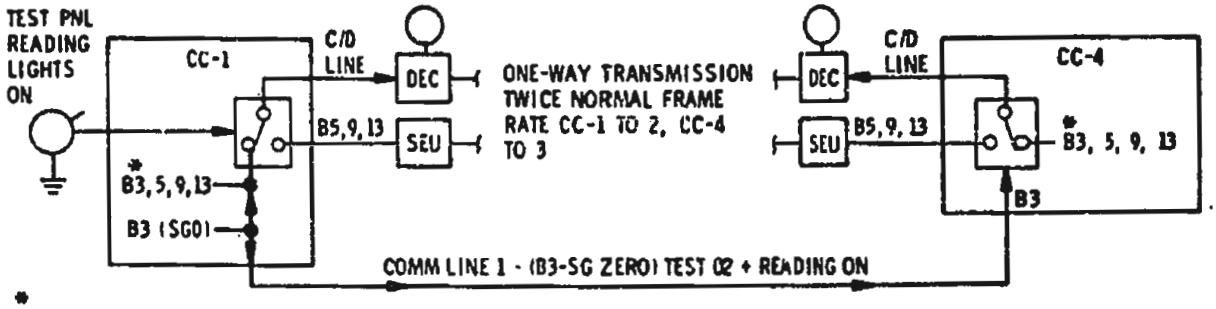
1 CC1 AND CC4 ONLY TRANSMIT EVERY FRAME TIME.
2 TEST COMMAND TO COMMUNITY 2 IS ON COMM-LINE 1 (LH OUTBOARD).
3 ATTENDANT CALL IS INHIBITED (CHIMES OPERATE).
4 COOL AIR VALVES OPERATE NORMALLY IN ALL TESTS.
5 READ LT ON TEST IS A SPECIFIC TEST OF OVERHEAD DECODERS, REFER TO SHEET 2.

M1–0000–23–3322

READ LT ON Test Failure
Figure 105 (Sheet 1)

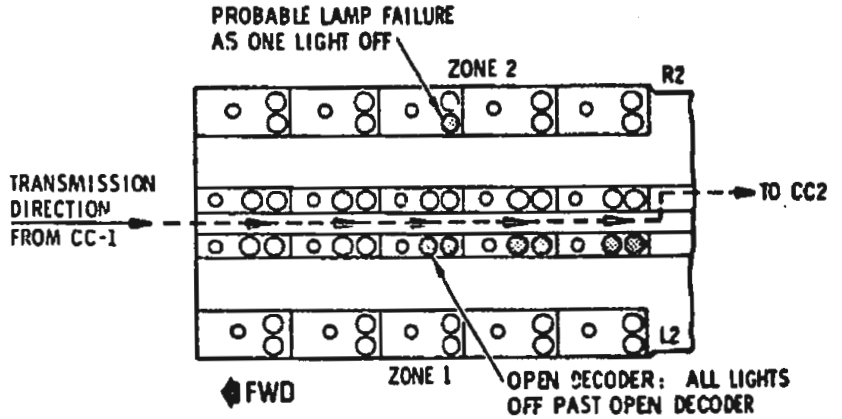


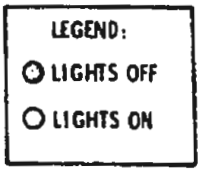
TEST DATA FLOW

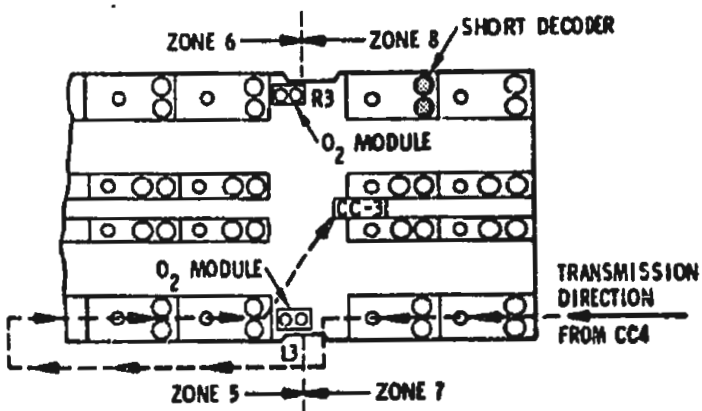


*
BIT 3 = TEST O_2 + READING LIGHTS ON
BIT 5 = READING LIGHTS 1 ON
BIT 0 = READING LIGHTS 2 ON
BIT 13 = READING LIGHTS 3 ON

TEST DATA BLOCK DIAGRAM







EXAMPLES OF FAILURES READING LIGHTS ON TEST

M1-0001-23-3323

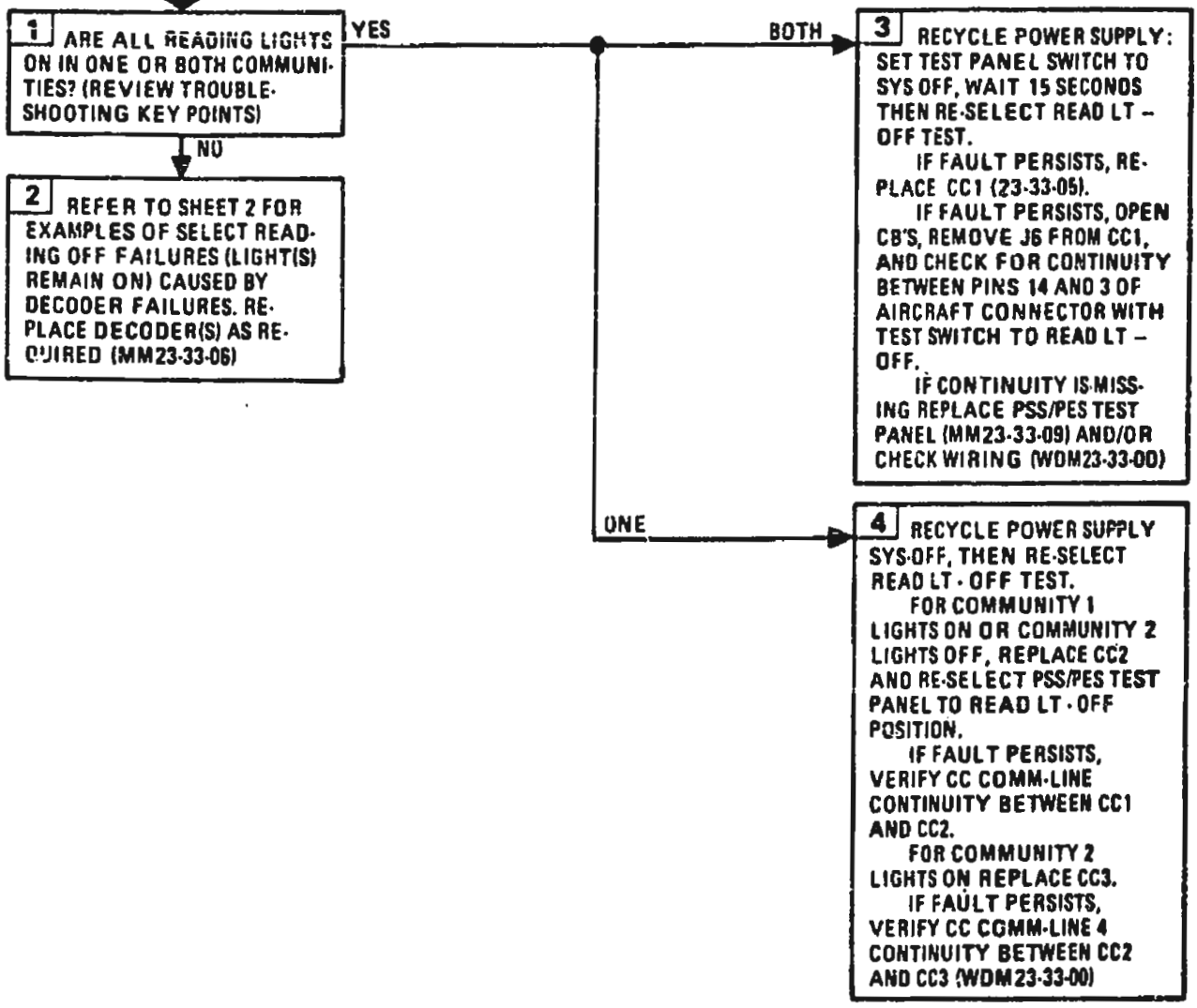
READ LT ON Test Failure
Figure 105 (Sheet 2)

R
R
005B

EFFECTIVITY: ALL

PREREQUISITES
ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB'S IN: 2C8, 2011 (2D10 ON SOME A/C)
RH GALLEY: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
LH GALLEY: POWER-PASS. SERV MDL – ALL CB'S
ON POWER SUPPLY ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

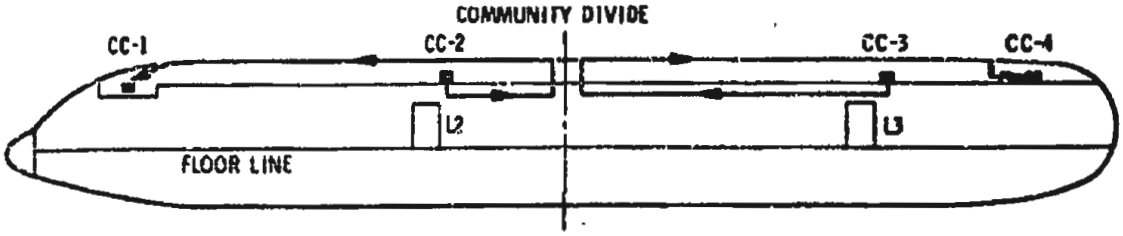
READ LT OFF TEST FAIL


1 ARE ALL READING LIGHTS ON IN ONE OR BOTH COMMUNITIES? (REVIEW TROUBLESHOOTING KEY POINTS)
YES
NO
BOTH
ONE
2 REFER TO SHEET 2 FOR EXAMPLES OF SELECT READING OFF FAILURES (LIGHT(S) REMAIN ON) CAUSED BY DECODER FAILURES. REPLACE DECODER(S) AS REQUIRED (MM23-33-06)
3 RECYCLE POWER SUPPLY: SET TEST PANEL SWITCH TO SYS OFF, WAIT 15 SECONDS THEN RE-SELECT READ LT – OFF TEST.
IF FAULT PERSISTS, REPLACE CC1 (23-33-05).
IF FAULT PERSISTS, OPEN CB'S, REMOVE J6 FROM CC1, AND CHECK FOR CONTINUITY BETWEEN PINS 14 AND 3 OF AIRCRAFT CONNECTOR WITH TEST SWITCH TO READ LT – OFF.
IF CONTINUITY IS MISSING REPLACE PSS/PES TEST PANEL (MM23-33-09) AND/OR CHECK WIRING (WDM23-33-00)
4 RECYCLE POWER SUPPLY SYS OFF, THEN RE-SELECT READ LT - OFF TEST.
FOR COMMUNITY 1 LIGHTS ON OR COMMUNITY 2 LIGHTS OFF, REPLACE CC2 AND RE-SELECT PSS/PES TEST PANEL TO READ LT - OFF POSITION.
IF FAULT PERSISTS, VERIFY CC COMM-LINE CONTINUITY BETWEEN CC1 AND CC2.
FOR COMMUNITY 2 LIGHTS ON REPLACE CC3.
IF FAULT PERSISTS, VERIFY CC COMM-LINE 4 CONTINUITY BETWEEN CC2 AND CC3 (WDM23-33-00)

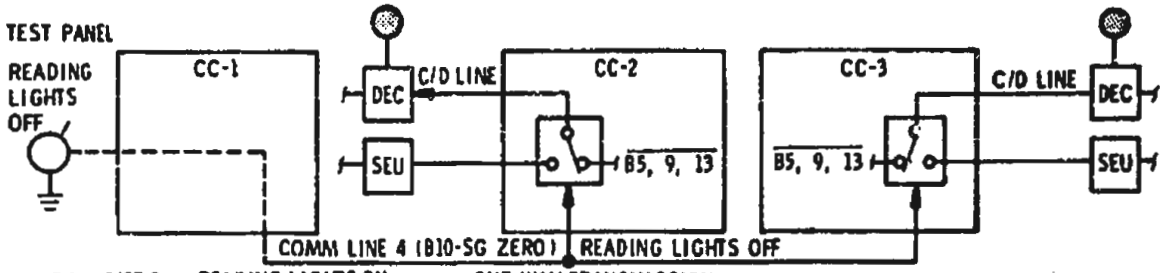
TROUBLESHOOTING KEY POINTS:
1 ONLY CC2 AND CC3 TRANSMIT.
2 TEST COMMAND TO COMMUNITY 2 IS ON COMM-LINE 4 (RH OUTBOARD).
3 ATTENDANT CALL INHIBITED (CHIME OPERATES).
4 READ LT OFF TEST IS A SPECIFIC TEST OF OVERHEAD DECODERS, REFER TO SHEET 2.

M1-0001-23-3324

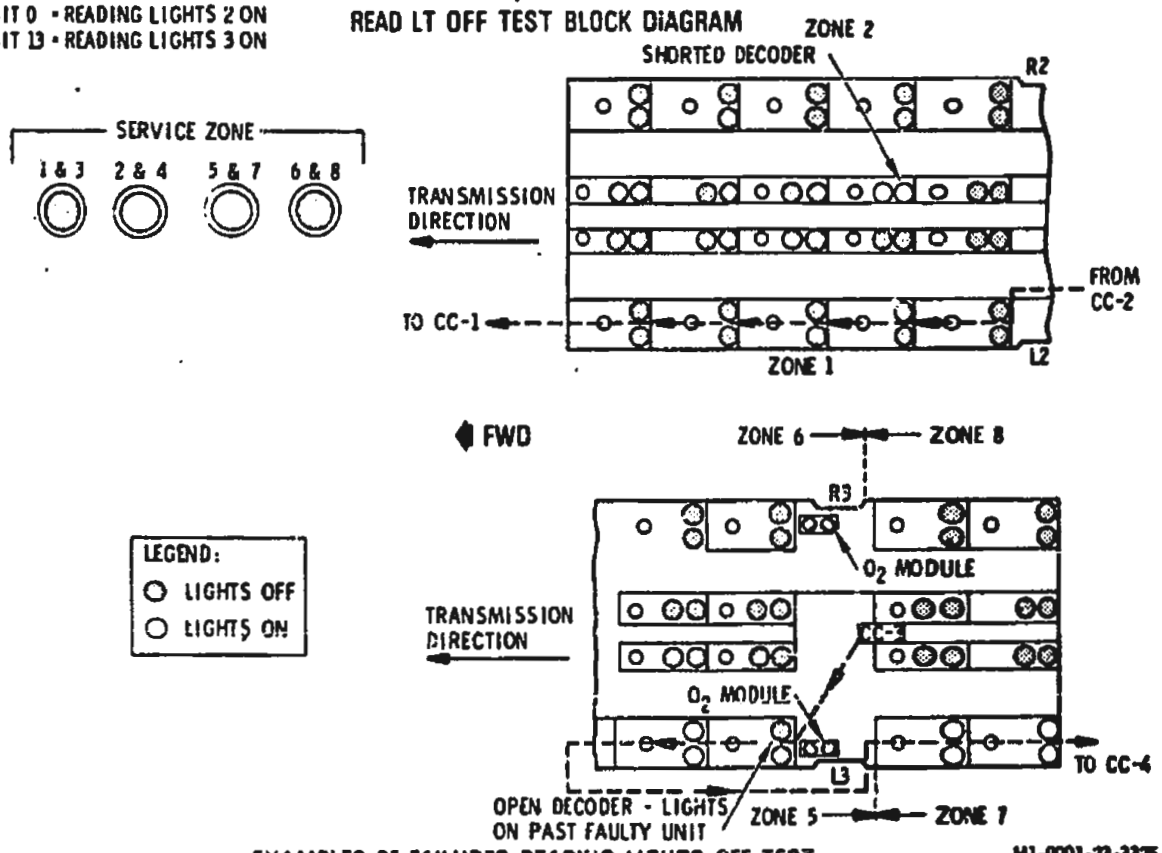
READ LT OFF Test Failure
Figure 106 (Sheet 1)



READ LT OFF TEST DATA FLOW



READ LT OFF TEST BLOCK DIAGRAM



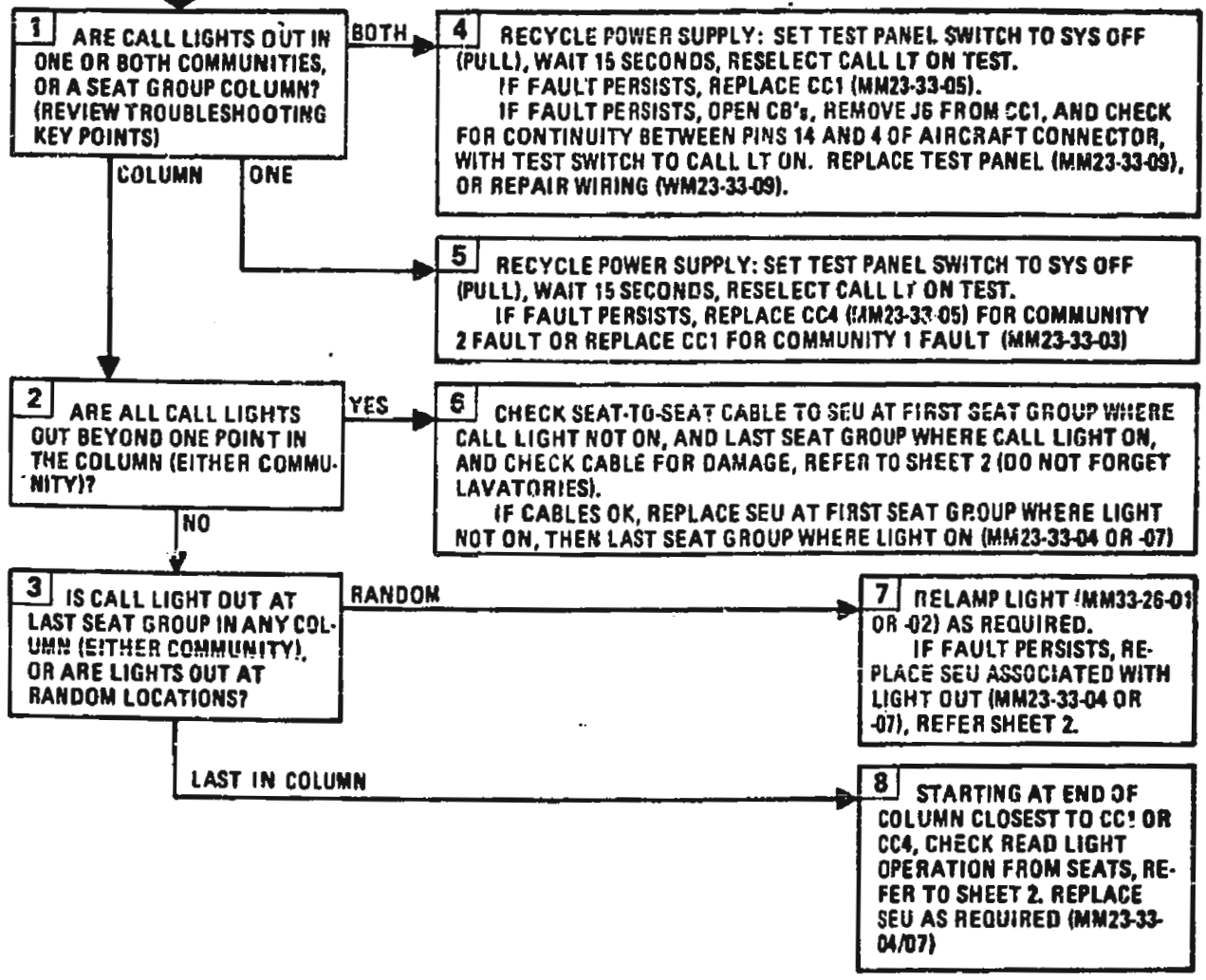
EXAMPLES OF FAILURES READING LIGHTS OFF TEST

M1-0001-23-3325

READ LT OFF Test Failure
Figure 106 (Sheet 2)

PREREQUISITES
ELEC POWER (MM24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-25-00)
CB's IN: 1A15, 1A16, 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER–PASS. SERV MDL
ON POWER SUPPLY CHECK ALL CB's CLOSED AND POWER CB1 SWITCH IN NORMAL

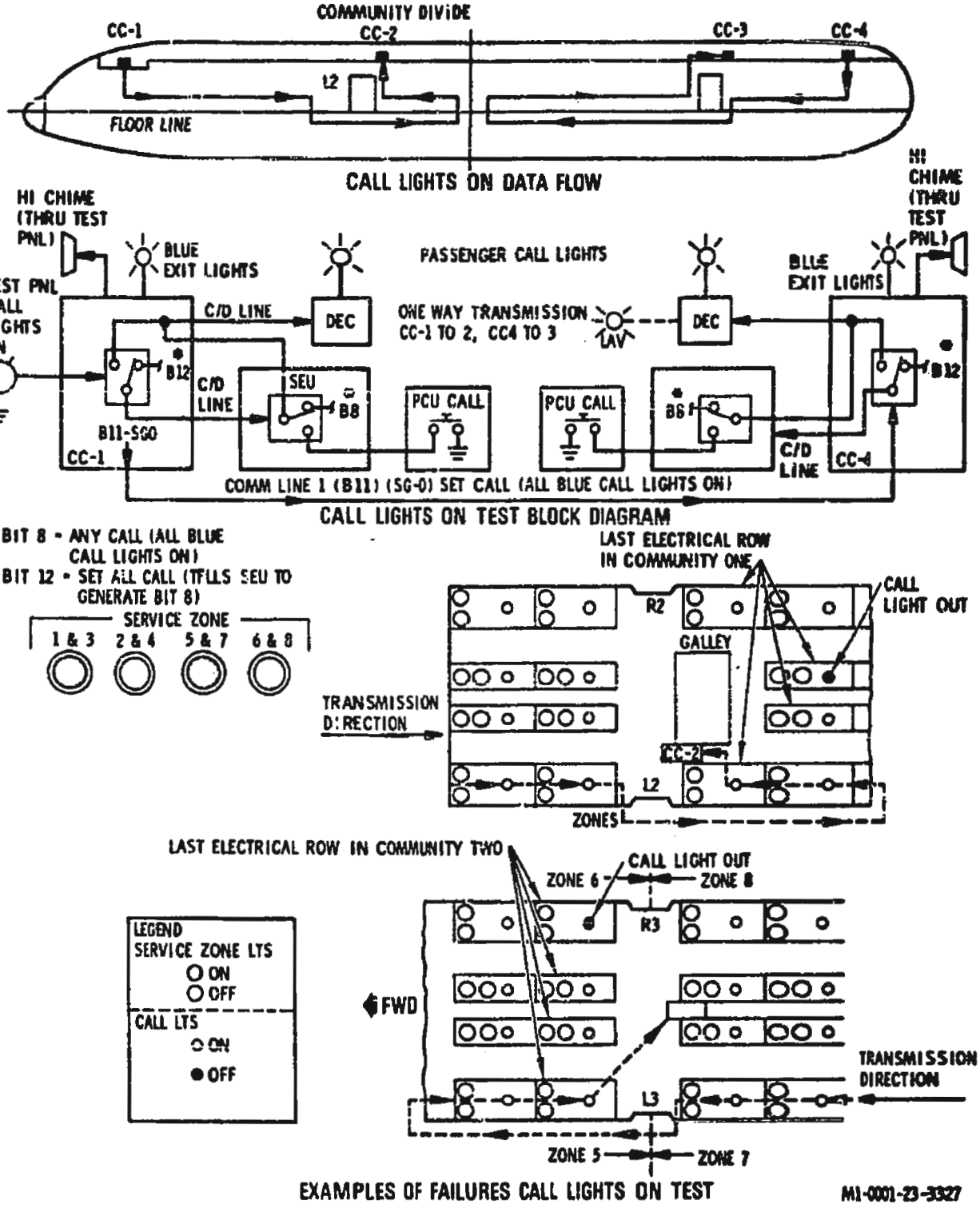
CALL LIGHT ON TEST FAIL (CALL LIGHTS OUT)


1 ARE CALL LIGHTS OUT IN ONE OR BOTH COMMUNITIES, OR A SEAT GROUP COLUMN? (REVIEW TROUBLESHOOTING KEY POINTS)
BOTH
4 RECYCLE POWER SUPPLY: SET TEST PANEL SWITCH TO SYS OFF (PULL), WAIT 15 SECONDS, RESELECT CALL LT ON TEST.
IF FAULT PERSISTS, REPLACE CC1 (MM23-33-05).
IF FAULT PERSISTS, OPEN CB's, REMOVE J6 FROM CC1, AND CHECK FOR CONTINUITY BETWEEN PINS 14 AND 4 OF AIRCRAFT CONNECTOR, WITH TEST SWITCH TO CALL LT ON. REPLACE TEST PANEL (MM23-33-09), OR REPAIR WIRING (WM23-33-09).
COLUMN
ONE
5 RECYCLE POWER SUPPLY: SET TEST PANEL SWITCH TO SYS OFF (PULL), WAIT 15 SECONDS, RESELECT CALL LT ON TEST.
IF FAULT PERSISTS, REPLACE CC4 (MM23-33-05) FOR COMMUNITY 2 FAULT OR REPLACE CC1 FOR COMMUNITY 1 FAULT (MM23-33-03)
2 ARE ALL CALL LIGHTS OUT BEYOND ONE POINT IN THE COLUMN (EITHER COMMUNITY)?
YES
6 CHECK SEAT-TO-SEAT CABLE TO SEU AT FIRST SEAT GROUP WHERE CALL LIGHT NOT ON, AND LAST SEAT GROUP WHERE CALL LIGHT ON, AND CHECK CABLE FOR DAMAGE, REFER TO SHEET 2 (DO NOT FORGET LAVATORIES).
IF CABLES OK, REPLACE SEU AT FIRST SEAT GROUP WHERE LIGHT NOT ON, THEN LAST SEAT GROUP WHERE LIGHT ON (MM23-33-04 OR -07)
NO
3 IS CALL LIGHT OUT AT LAST SEAT GROUP IN ANY COLUMN (EITHER COMMUNITY), OR ARE LIGHTS OUT AT RANDOM LOCATIONS?
RANDOM
7 RELAMP LIGHT (MM33-26-01 OR -02) AS REQUIRED.
IF FAULT PERSISTS, REPLACE SEU ASSOCIATED WITH LIGHT OUT (MM23-33-04 OR -07), REFER SHEET 2.
LAST IN COLUMN
8 STARTING AT END OF COLUMN CLOSEST TO CC1 OR CC4, CHECK READ LIGHT OPERATION FROM SEATS, REFER TO SHEET 2. REPLACE SEU AS REQUIRED (MM23-33-04/07)

TROUBLESHOOTING KEY POINTS:
1 CALL LT ON TEST IS A SPECIFIC TEST OF THE SEAT ELECTRONICS UNITS (SEU).
2 A SHORTED SEU WILL APPEAR AS A FAILURE IN THE LAST ELECTRICAL SEAT GROUP IN THE COMMUNITY, REFER TO SHEET 2.
3 ONLY CC1 AND CC4 TRANSMIT.
4 READING LIGHTS ARE OPERABLE IN CALL LT TESTS.

M1-0002-23-3326

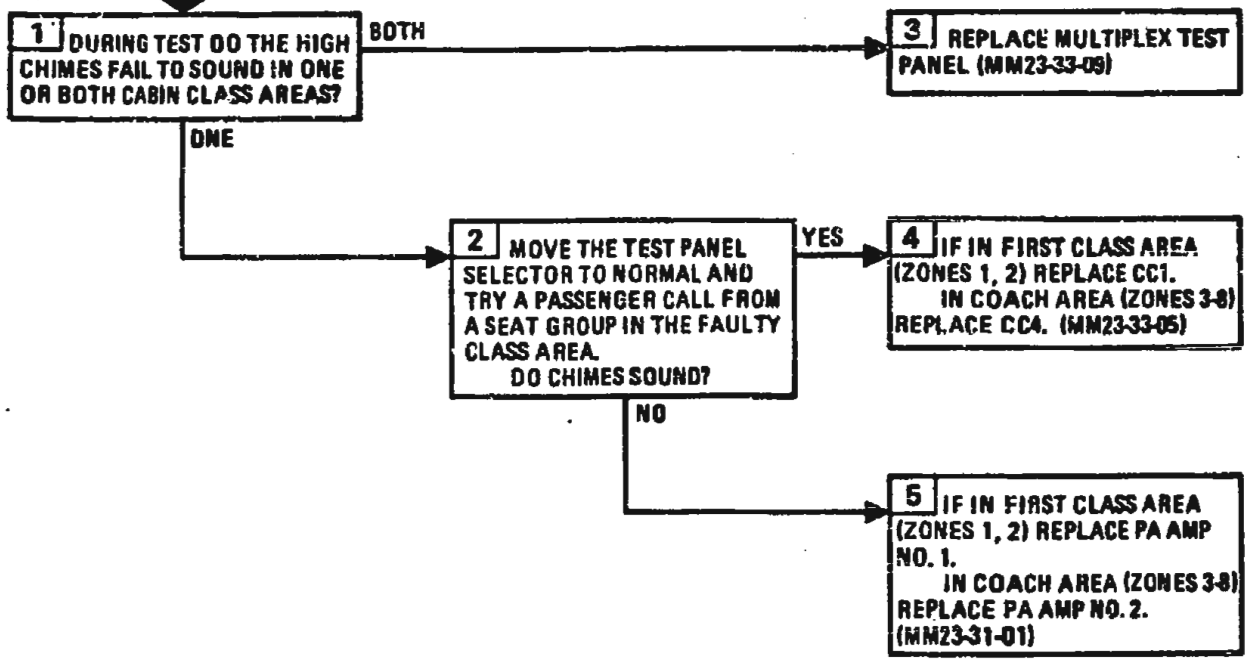
CALL LT ON Test Failure (Call Lights Out)
Figure 107 (Sheet 1)



CALL LT ON Test Failure (Call Lights Out)
Figure 107 (Sheet 2)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-25-00)
CB'S IN: 1A15, 1A16, 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTI-PLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER—PASS. SERV MDL
ON POWER SUPPLY CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

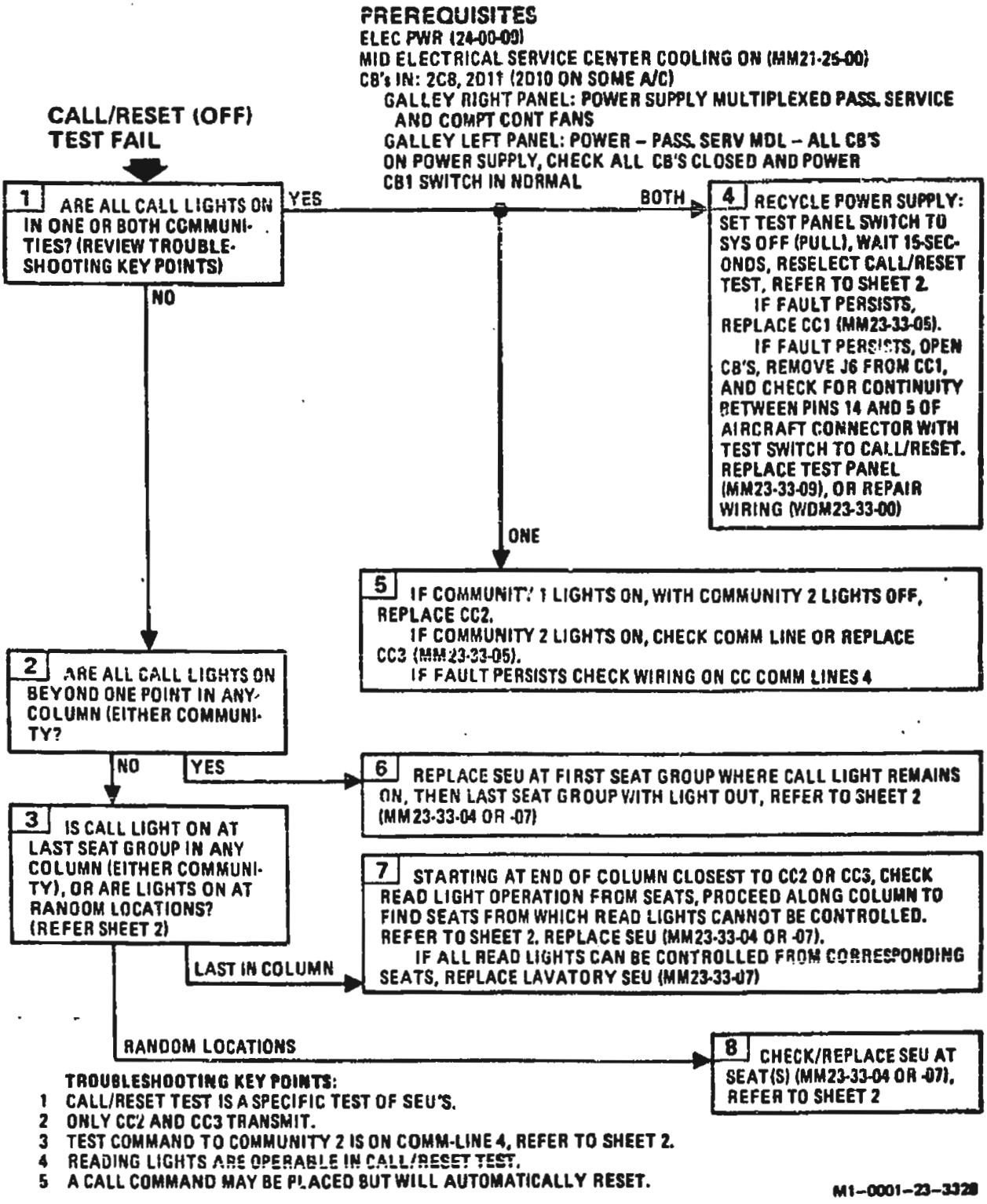
CALL LIGHT ON TEST FAIL (HIGH CHIMES DO NOT OPERATE)


1 DURING TEST DO THE HIGH CHIMES FAIL TO SOUND IN ONE OR BOTH CABIN CLASS AREAS?
BOTH
3 REPLACE MULTIPLEX TEST PANEL (MM23-33-09)
ONE
2 MOVE THE TEST PANEL SELECTOR TO NORMAL AND TRY A PASSENGER CALL FROM A SEAT GROUP IN THE FAULTY CLASS AREA. DO CHIMES SOUND?
YES
4 IF IN FIRST CLASS AREA (ZONES 1, 2) REPLACE CC1. IN COACH AREA (ZONES 3-8) REPLACE CC4. (MM23-33-05)
NO
5 IF IN FIRST CLASS AREA (ZONES 1, 2) REPLACE PA AMP NO. 1. IN COACH AREA (ZONES 3-8) REPLACE PA AMP NO. 2. (MM23-31-01)

TROUBLESHOOTING KEY POINT
1 ONLY CC1 AND CC4 TRANSMIT DURING TEST

M1-C000-23-3807

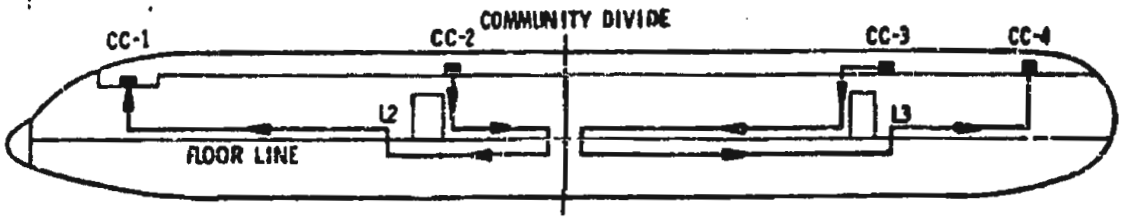
CALL LT ON Test Failure (High Chimes Do Not Operate)
Figure 108


PREREQUISITES
ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-25-00)
CB's IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB'S ON POWER SUPPLY, CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL
CALL/RESET (OFF) TEST FAIL
1 ARE ALL CALL LIGHTS ON IN ONE OR BOTH COMMUNITIES? (REVIEW TROUBLESHOOTING KEY POINTS)
YES
BOTH
4 RECYCLE POWER SUPPLY: SET TEST PANEL SWITCH TO SYS OFF (PULL), WAIT 15-SECONDS, RESELECT CALL/RESET TEST, REFER TO SHEET 2. IF FAULT PERSISTS, REPLACE CC1 (MM23-33-05). IF FAULT PERSISTS, OPEN CB'S, REMOVE J6 FROM CC1, AND CHECK FOR CONTINUITY BETWEEN PINS 14 AND 5 OF AIRCRAFT CONNECTOR WITH TEST SWITCH TO CALL/RESET. REPLACE TEST PANEL (MM23-33-09), OR REPAIR WIRING (WDM23-33-00)
NO
ONE
5 IF COMMUNITY 1 LIGHTS ON, WITH COMMUNITY 2 LIGHTS OFF, REPLACE CC2. IF COMMUNITY 2 LIGHTS ON, CHECK COMM LINE OR REPLACE CC3 (MM23-33-05). IF FAULT PERSISTS CHECK WIRING ON CC COMM LINES 4
2 ARE ALL CALL LIGHTS ON BEYOND ONE POINT IN ANY COLUMN (EITHER COMMUNITY?
NO
YES
6 REPLACE SEU AT FIRST SEAT GROUP WHERE CALL LIGHT REMAINS ON, THEN LAST SEAT GROUP WITH LIGHT OUT, REFER TO SHEET 2 (MM23-33-04 OR -07)
3 IS CALL LIGHT ON AT LAST SEAT GROUP IN ANY COLUMN (EITHER COMMUNITY), OR ARE LIGHTS ON AT RANDOM LOCATIONS? (REFER SHEET 2)
LAST IN COLUMN
7 STARTING AT END OF COLUMN CLOSEST TO CC2 OR CC3, CHECK READ LIGHT OPERATION FROM SEATS, PROCEED ALONG COLUMN TO FIND SEATS FROM WHICH READ LIGHTS CANNOT BE CONTROLLED. REFER TO SHEET 2. REPLACE SEU (MM23-33-04 OR -07). IF ALL READ LIGHTS CAN BE CONTROLLED FROM CORRESPONDING SEATS, REPLACE LAVATORY SEU (MM23-33-07)
RANDOM LOCATIONS
8 CHECK/REPLACE SEU AT SEAT(S) (MM23-33-04 OR -07), REFER TO SHEET 2
TROUBLESHOOTING KEY POINTS:
1 CALL/RESET TEST IS A SPECIFIC TEST OF SEU'S.
2 ONLY CC2 AND CC3 TRANSMIT.
3 TEST COMMAND TO COMMUNITY 2 IS ON COMM-LINE 4, REFER TO SHEET 2.
4 READING LIGHTS ARE OPERABLE IN CALL/RESET TEST.
5 A CALL COMMAND MAY BE PLACED BUT WILL AUTOMATICALLY RESET.
M1-0001-23-3328

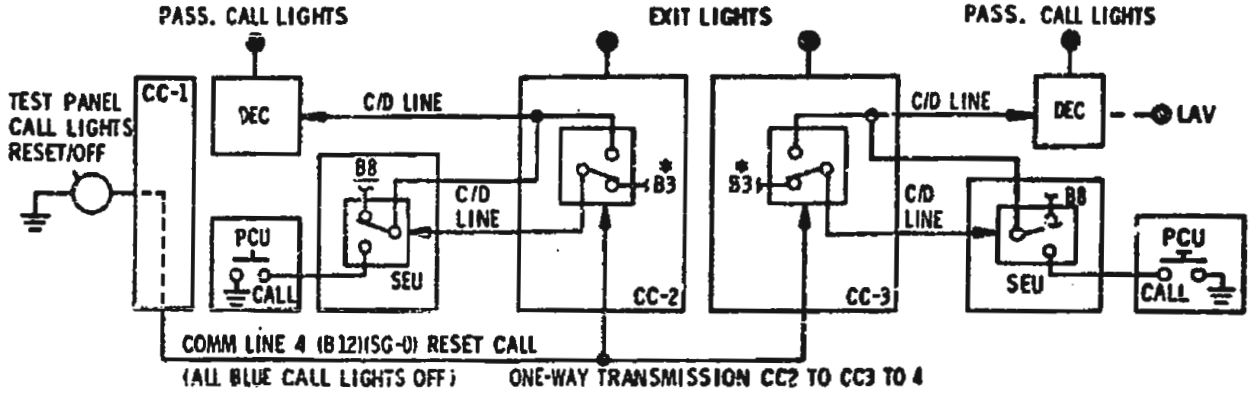
CALL/RESET (OFF) Test Failure
Figure 109 (Sheet 1)

R
R
005B

EFFECTIVITY: ALL

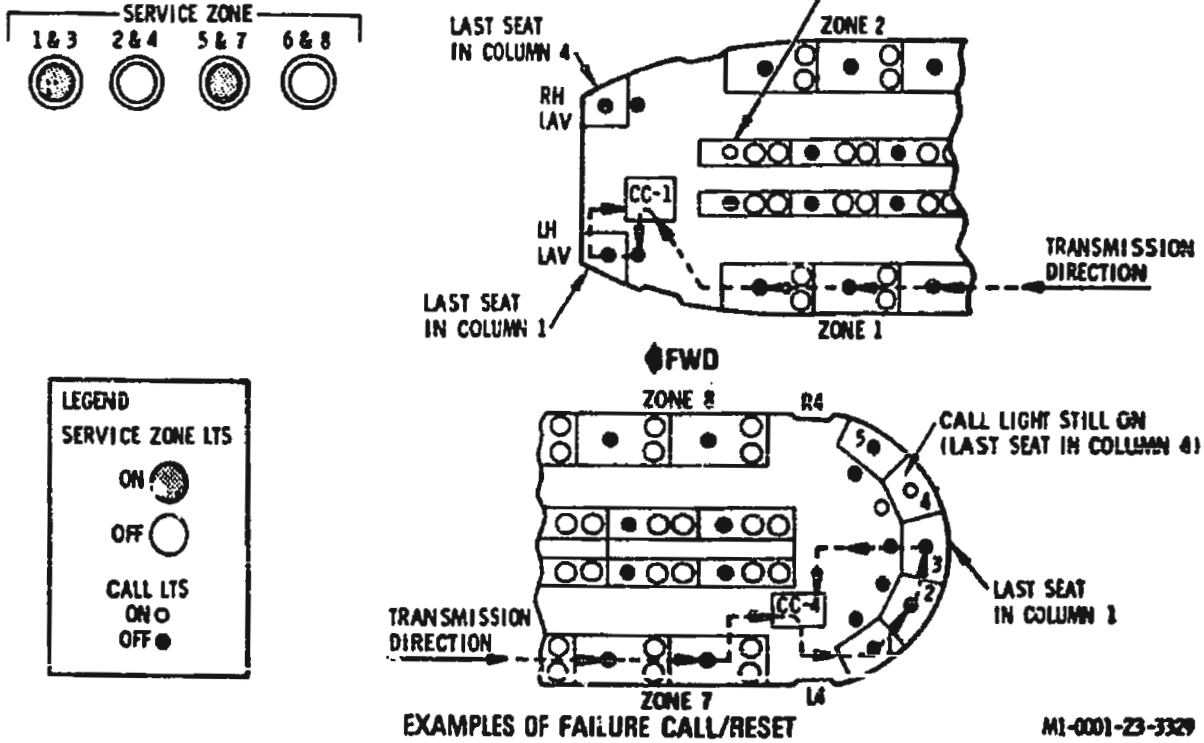


CALL/RESET TEST DATA FLOW



* BIT 8 - ANY CALL (ALL BLUE CALL LIGHTS ON)
* BIT 12 - SET ALL CALL (TELLS SEU TO DISCONNECT PCU AND GENERATE B8)
* BIT 3 - RESET CALL (TELLS SEU TO GENERATE B8)

CALL/RESET TEST BLOCK DIAGRAM



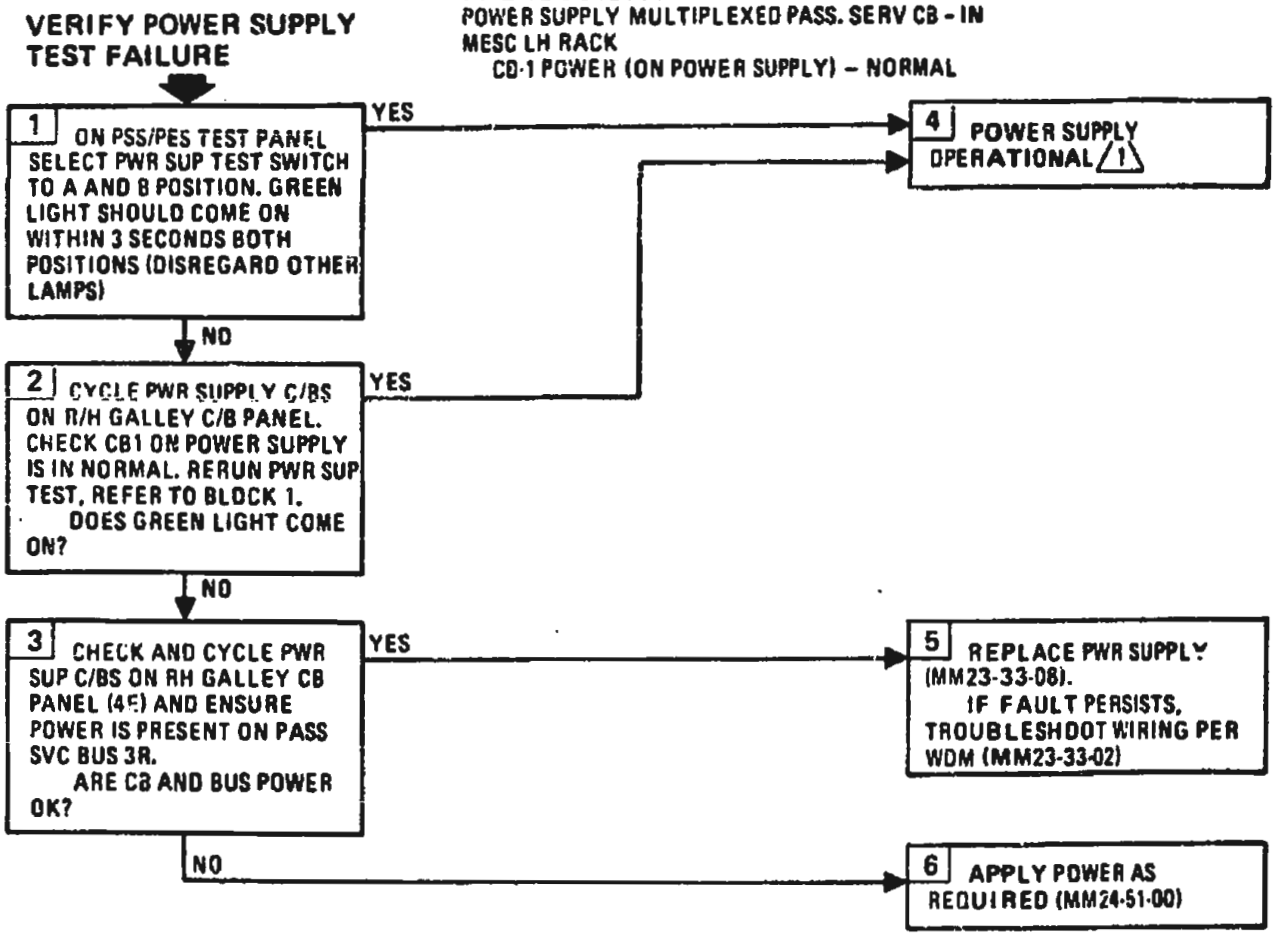
EXAMPLES OF FAILURE CALL/RESET

M1-0001-23-3329

CALL/RESET (OFF) Test Failure
Figure 109 (Sheet 2)

PREREQUISITIES

POWER SUPPLY MULTIPLEXED PASS. SERV CB - IN
MESC LH RACK
CD-1 POWER (ON POWER SUPPLY) - NORMAL


VERIFY POWER SUPPLY TEST FAILURE
1 ON PSS/PES TEST PANEL SELECT PWR SUP TEST SWITCH TO A AND B POSITION. GREEN LIGHT SHOULD COME ON WITHIN 3 SECONDS BOTH POSITIONS (DISREGARD OTHER LAMPS)
YES
4 POWER SUPPLY OPERATIONAL /1\
NO
2 CYCLE PWR SUPPLY C/BS ON R/H GALLEY C/B PANEL. CHECK CB1 ON POWER SUPPLY IS IN NORMAL. RERUN PWR SUP TEST, REFER TO BLOCK 1. DOES GREEN LIGHT COME ON?
YES
NO
3 CHECK AND CYCLE PWR SUP C/BS ON RH GALLEY CB PANEL (4F) AND ENSURE POWER IS PRESENT ON PASS SVC BUS 3R. ARE CB AND BUS POWER OK?
YES
5 REPLACE PWR SUPPLY (MM23-33-08). IF FAULT PERSISTS, TROUBLESHOOT WIRING PER WDM (MM23-33-02)
NO
6 APPLY POWER AS REQUIRED (MM24-51-00)

/1\ NOTE
POWER SUPPLY TEST WILL VERIFY PSS POWER SUPPLY OUTPUTS (GROUP 1), HOWEVER, IT DOES NOT VERIFY POWER (GROUP 2) FOR THE PES MAIN MULTIPLEXER

M1-0001-23-3330

PSS/PES POWER SUPPLY Test Failure
Figure 110

PREREQUISITES
ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB's IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB's
ON POWER SUPPLY CHECK ALL CB's CLOSED AND POWER
CB1 SWITCH IN NORMAL
PSS TEST SWITCH IN THE NORM POSITION

ALL BLUE CALL LIGHTS NOT ON AND/OR TEST PANEL FAULT LIGHT(S) ON

1 REVIEW TROUBLESHOOTING KEY POINTS. NOTE WHICH SERVICE ZONE FAULT LIGHT(S) IS ON AND REFER TO ENTERTAIN TEST DATA FLOW SCHEMATIC (SHEET 2) TO LOCATE FAILED ZONE SEAT GROUPS.
ARE ALL OR PART OF CALL LIGHTS OUT IN A COLUMN?

YES → ALL → **3** CHECK COAX CABLE CONNECTIONS AT SUB MUX AND EOZ TERMINATIONS

YES → PARTIAL → **4** CHECK FOR DISCONNECTED SEAT-TO-SEAT CABLE. CHECK NOISE AT PCU, AS A DISCONNECTED OR OPEN SEAT-TO-SEAT CABLE CAUSES NOISE UP TO POINT OF OPEN AND SILENCE BEYOND

NO ↓

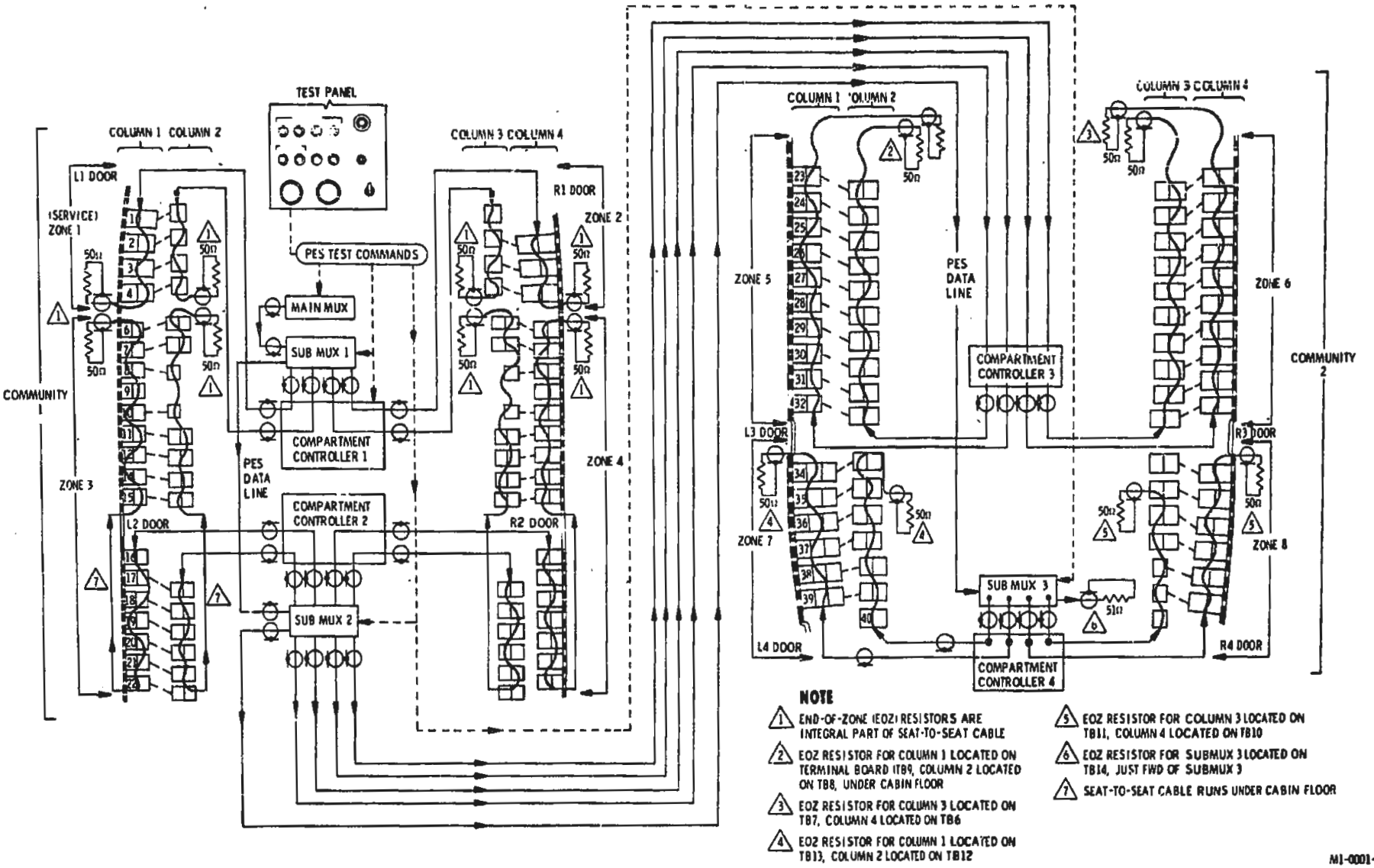
2 CHECK FOR TEST TONE PRESENCE AT BOTH (OR ALL) SEAT PCUs IN SEAT GROUP. IF TEST TONE IS PRESENT AT ONE SEAT PCU BUT NOT OTHER(S), SWAP PCUs TO DETERMINE IF FAULT IS IN PCU OR SEU.
REPLACEMENT SEU (MM23-33-04), PCU (MM25-21-00). NOTE, IF SEAT CALL LIGHT IS OUT BUT TEST TONE IS PRESENT, SEU HAS FAILED

TROUBLESHOOTING KEY POINTS:
1 ENTERTAIN TEST CHECKS PES CIRCUITRY IN SEUs AND PCUs, AND MAIN SUB MUXs ABILITY TO TRANSMIT SIGNALS.
2 MAIN MULTIPLEXER FAILURE INHIBITS TEST PANEL SUB FAILURE LIGHT.
3 SERVICE ZONE FAILURE LIGHTS GO OUT WHEN FAILURES ARE CLEARED.
4 DIRTY PCU VOLUME/PROGRAM SELECTION CONTROLS CAN CAUSE TEST FAILURES. ROTATE PCU CONTROLS AT FAILED SEAT(S).
5 EXIT SIGN/SERVICE ZONE ASSIGNMENT:

SIGN	ZONE
L1	1
R1	2
L2	3
R2	4
L3	5
R3	6
L4	7
R4	8

M1–0000–23–3331

PES ENTERTAIN/AUD TEST Failure
Figure 111 (Sheet 1)

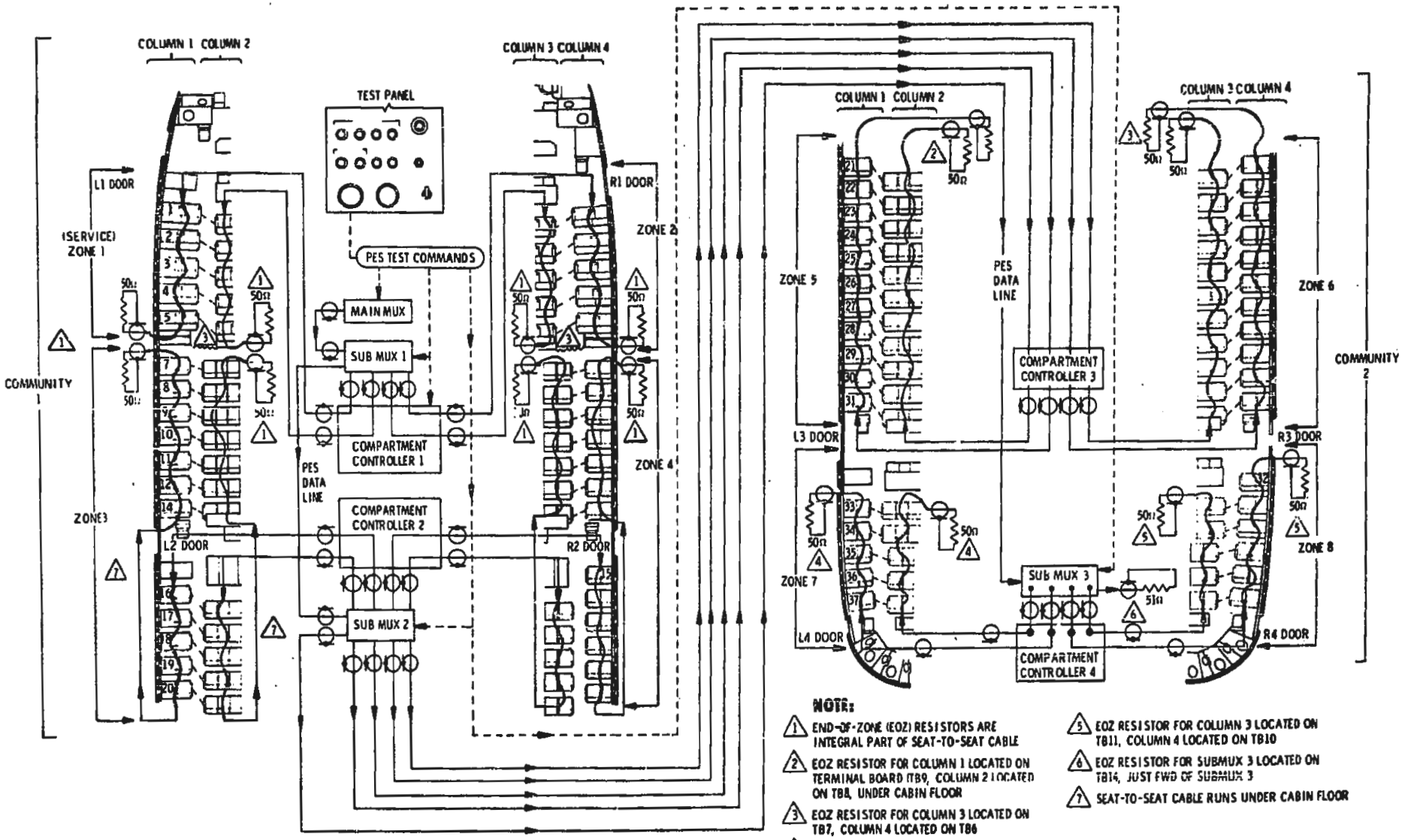


NOTE

1. END-OF-ZONE (EOZ) RESISTORS ARE INTEGRAL PART OF SEAT-TO-SEAT CABLE
2. EOZ RESISTOR FOR COLUMN 1 LOCATED ON TERMINAL BOARD (TB9, COLUMN 2 LOCATED ON TB8, UNDER CABIN FLOOR
3. EOZ RESISTOR FOR COLUMN 3 LOCATED ON TB7, COLUMN 4 LOCATED ON TB6
4. EOZ RESISTOR FOR COLUMN 1 LOCATED ON TB13, COLUMN 2 LOCATED ON TB12
5. EOZ RESISTOR FOR COLUMN 3 LOCATED ON TB11, COLUMN 4 LOCATED ON TB10
6. EOZ RESISTOR FOR SUBMUX 3 LOCATED ON TB14, JUST FWD OF SUBMUX 3
7. SEAT-TO-SEAT CABLE RUNS UNDER CABIN FLOOR

MI-0001-23-3332

PES ENTERTAIN/AUD TEST Failure
Figure 111 (Sheet 2)



NOTE:

1. END-OF-ZONE (EOZ) RESISTORS ARE INTEGRAL PART OF SEAT-TO-SEAT CABLE
2. EOZ RESISTOR FOR COLUMN 1 LOCATED ON TERMINAL BOARD ITB9, COLUMN 2 LOCATED ON TB8, UNDER CABIN FLOOR
3. EOZ RESISTOR FOR COLUMN 3 LOCATED ON TB7, COLUMN 4 LOCATED ON TB6
4. EOZ RESISTOR FOR COLUMN 1 LOCATED ON TB13, COLUMN 2 LOCATED ON TB12
5. EOZ RESISTOR FOR COLUMN 3 LOCATED ON TB11, COLUMN 4 LOCATED ON TB10
6. EOZ RESISTOR FOR SUBMUX 3 LOCATED ON TB14, JUST FWD OF SUBMUX 3
7. SEAT-TO-SEAT CABLE RUNS UNDER CABIN FLOOR

M1-0000-23-3668

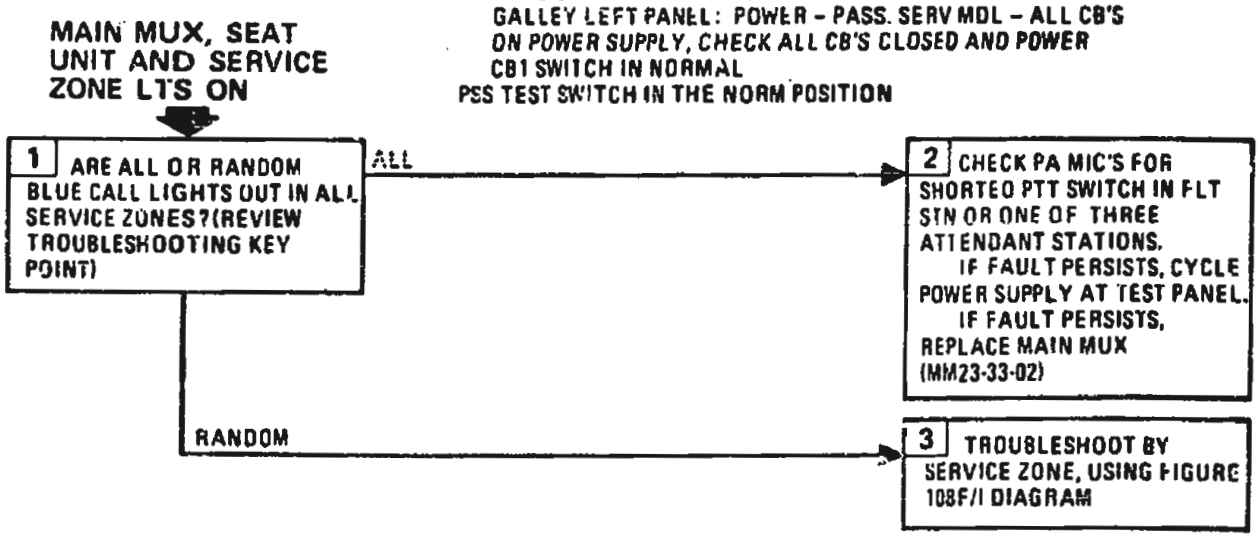
R
R
PES ENTERTAIN/AUD TEST Failure
Figure 111 (Sheet 2)

R
R
EFFECTIVITY: 032-999

0058

PREREQUISITES

ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB'S
ON POWER SUPPLY, CHECK ALL CB'S CLOSED AND POWER
CB1 SWITCH IN NORMAL
PSS TEST SWITCH IN THE NORM POSITION


MAIN MUX, SEAT UNIT AND SERVICE ZONE LTS ON
1 ARE ALL OR RANDOM BLUE CALL LIGHTS OUT IN ALL SERVICE ZONES? (REVIEW TROUBLESHOOTING KEY POINT)
ALL
2 CHECK PA MIC'S FOR SHORTED PTT SWITCH IN FLT STN OR ONE OF THREE ATTENDANT STATIONS.
IF FAULT PERSISTS, CYCLE POWER SUPPLY AT TEST PANEL.
IF FAULT PERSISTS, REPLACE MAIN MUX (MM23-33-02)
RANDOM
3 TROUBLESHOOT BY SERVICE ZONE, USING FIGURE 108F/I DIAGRAM

TROUBLESHOOTING KEY POINT:

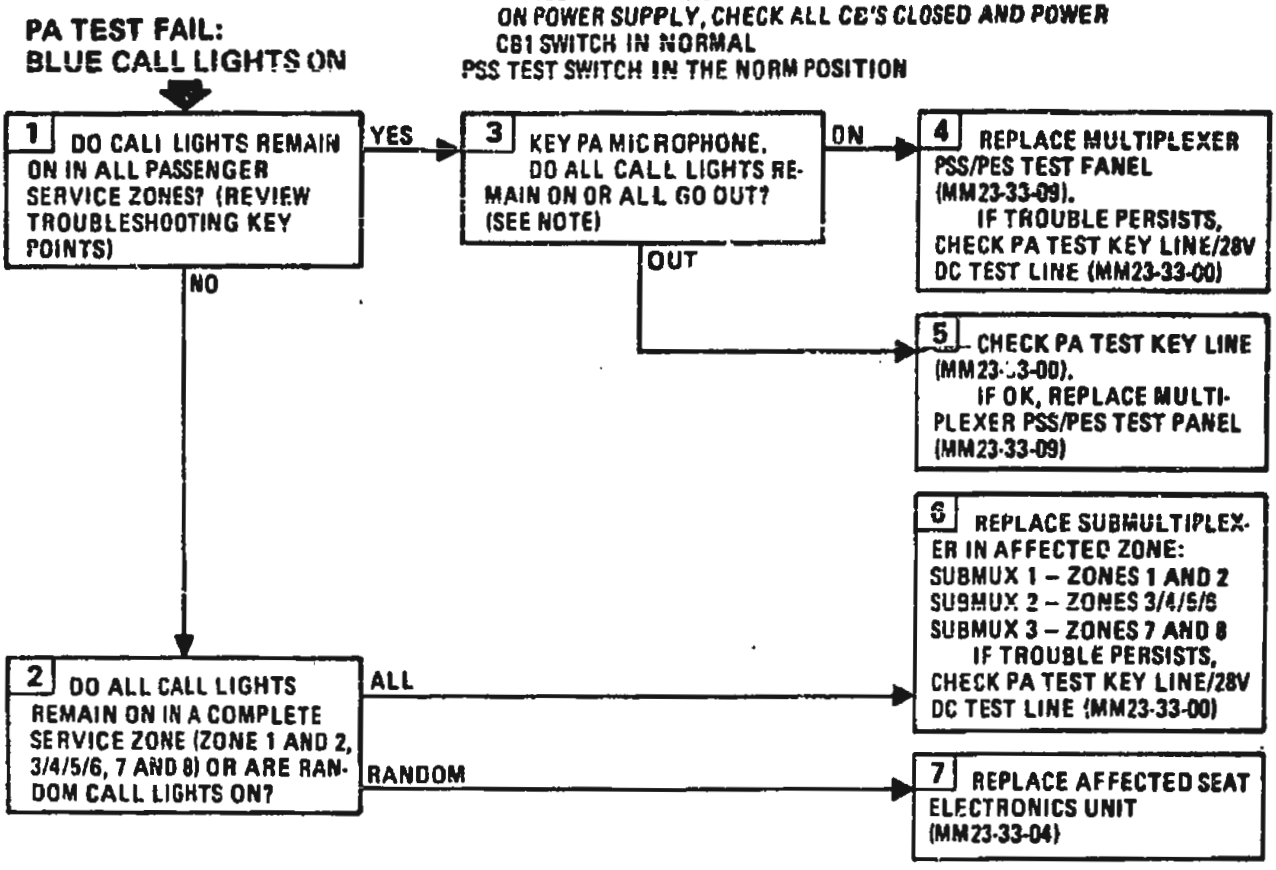
1 FAILURE OF ENOUGH SEAT ELECTRONIC UNITS IN EACH ZONE WILL INDICATE AS A SUB MUX FAILURE. TWO SUB MUX FAILURES WILL CAUSE MAIN MUX LIGHT TO COME ON.

M1 0001 23-3333

MAIN MULTIPLEXER Fail Light On
Figure 112

PREREQUISITES

ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB'S
ON POWER SUPPLY, CHECK ALL CB'S CLOSED AND POWER
CB1 SWITCH IN NORMAL
PSS TEST SWITCH IN THE NORM POSITION


PA TEST FAIL:
BLUE CALL LIGHTS ON
1 DO CALL LIGHTS REMAIN ON IN ALL PASSENGER SERVICE ZONES? (REVIEW TROUBLESHOOTING KEY POINTS)
YES
NO
3 KEY PA MICROPHONE. DO ALL CALL LIGHTS REMAIN ON OR ALL GO OUT? (SEE NOTE)
ON
OUT
4 REPLACE MULTIPLEXER PSS/PES TEST PANEL (MM23-33-09). IF TROUBLE PERSISTS, CHECK PA TEST KEY LINE/28V DC TEST LINE (MM23-33-00)
5 CHECK PA TEST KEY LINE (MM23-33-00). IF OK, REPLACE MULTIPLEXER PSS/PES TEST PANEL (MM23-33-09)
2 DO ALL CALL LIGHTS REMAIN ON IN A COMPLETE SERVICE ZONE (ZONE 1 AND 2, 3/4/5/6, 7 AND 8) OR ARE RANDOM CALL LIGHTS ON?
ALL
RANDOM
6 REPLACE SUBMULTIPLEXER IN AFFECTED ZONE:
SUBMUX 1 – ZONES 1 AND 2
SUBMUX 2 – ZONES 3/4/5/6
SUBMUX 3 – ZONES 7 AND 8
IF TROUBLE PERSISTS, CHECK PA TEST KEY LINE/28V DC TEST LINE (MM23-33-00)
7 REPLACE AFFECTED SEAT ELECTRONICS UNIT (MM23-33-04)

TROUBLESHOOTING KEY POINTS:

1 PA TEST CHECKS SUBMULTIPLEXER(S) AND SEU(S) PA OVERRIDE FUNCTION.
2 SERVICE ZONE, MAIN MULTIPLEXER AND SEAT UNIT FAULT LIGHTS SHOULD BE ON AND TEST TONE SHOULD BE PRESENT AT EACH PCU, BUT LOWER IN VOLUME COMPARED TO ENTERTAIN TEST MODE.

M1-0000-23-3334

PA TEST Failure
Figure 113

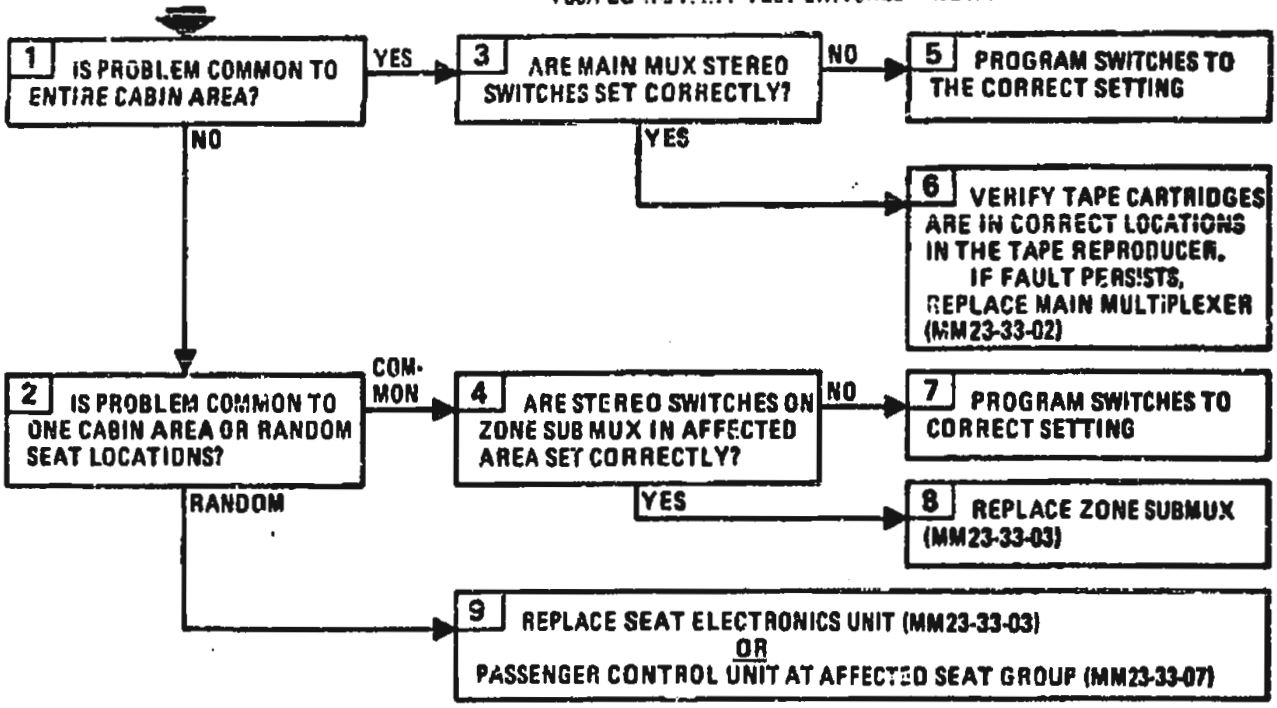
R
R
005B

EFFECTIVITY: ALL

DIFFERENT AUDIO CHANNELS IN EACH EAR

PREREQUISITES

1 MULIPLEXER PSS/PES TEST PANEL:
PSS/PES ROTARY TEST SWITCHES – NORM


1 IS PROBLEM COMMON TO ENTIRE CABIN AREA?
YES
3 ARE MAIN MUX STEREO SWITCHES SET CORRECTLY?
NO
5 PROGRAM SWITCHES TO THE CORRECT SETTING
YES
6 VERIFY TAPE CARTRIDGES ARE IN CORRECT LOCATIONS IN THE TAPE REPRODUCER. IF FAULT PERSISTS, REPLACE MAIN MULTIPLEXER (MM23-33-02)
NO
2 IS PROBLEM COMMON TO ONE CABIN AREA OR RANDOM SEAT LOCATIONS?
COM-MON
4 ARE STEREO SWITCHES ON ZONE SUB MUX IN AFFECTED AREA SET CORRECTLY?
NO
7 PROGRAM SWITCHES TO CORRECT SETTING
YES
8 REPLACE ZONE SUBMUX (MM23-33-03)
RANDOM
9 REPLACE SEAT ELECTRONICS UNIT (MM23-33-03)
OR
PASSENGER CONTROL UNIT AT AFFECTED SEAT GROUP (MM23-33-07)

SEAT PCU CHAN	AUDIO FROM (SOURCE)	MUX CHAN (P TIME)	STEREO SWITCH (SW POSITION)	TYPE PROGRAM	TAPE RPDR TRK/ MOVIE	TAPE CASSETTE (SLOT)
1	SUBMUX	1	S/MUX S1	MONO	MOVIE CHAN 1	NONE
2	SUBMUX	2	S/MUX S1	MONO	MOVIE CHAN 2	NONE
3	M/MUX	5 & 6	M/MUX S5	STEREO	1 & 3	1
4	M/MUX	7 & 8	M/MUX S7	STEREO	2 & 4	1
5	M/MUX	9	M/MUX S9	MONO	5	2
6	M/MUX	10	M/MUX S9	MONO	7	2
7	M/MUX	11	M/MUX S11	MONO	6	2
8	M/MUX	12	M/MUX S11	MONO	8	2
9	M/MUX	13	M/MUX S13	MONO EX-TEND PLAY	13/14	4
10	M/MUX	14	M/MUX S13	MONO EX-TEND PLAY	15/16	4
11	SUBMUX	3	S/MUX S3	NONE	NONE (SPARE)	NONE
12	SUBMUX	4	S/MUX S3	NONE	NONE (SPARE)	NONE

M1–5002–23–1194

Different Audio Each Ear
Figure 114

PREREQUISITES
ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER–PASS. SERV MDL – ALL CB'S ON POWER SUPPLY, CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

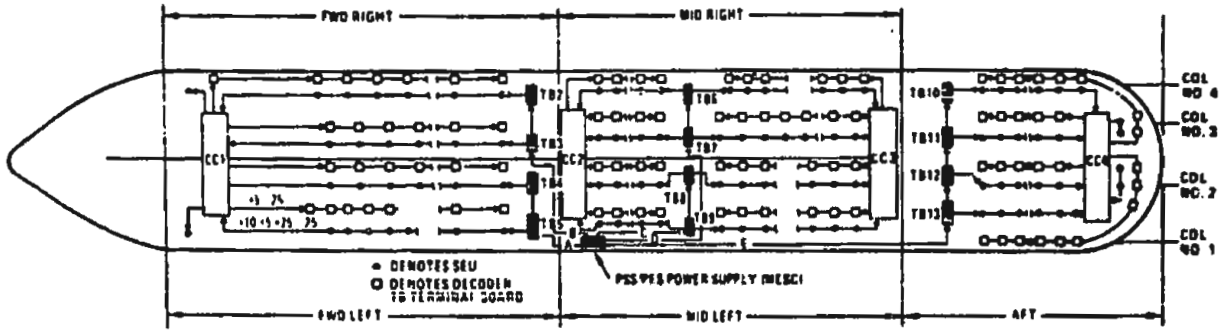
FLASHING READING LIGHTS/CYCLING AIR VALVES

1 DO LIGHTS FLASH IN ONE SECTION OF A COLUMN OR IN ADJACENT SECTIONS OF SEVERAL COLUMNS? (REVIEW TROUBLESHOOTING KEY POINTS)

SINGLE SECTION/COLUMN → **3** LOCATE SEAT GROUP WHERE FLASHING LIGHT(S) START AND SUBSTITUTE DECODER.
IF FAULT PERSISTS, SUBSTITUTE DECODER ELECTRICALLY FORWARD OF FAULTY SEAT GROUP.
IF FAULT PERSISTS, SUBSTITUTE DECODER ELECTRICALLY AFT OF FAULTY SEAT GROUP.
IF FAULT PERSISTS, SUBSTITUTE SEU'S IN SAME MANNER DECODERS WERE SUBSTITUTED. REPLACE FAULTY DECODER (MM23-33-06) OR SEU (MM23-33-04) AS REQUIRED

ADJACENT SECTIONS/ COLUMNS ↓

2 PROBABLE CAUSE, FLUCTUATING +5V DC. REPLACE ASSOCIATED COMPARTMENT CONTROLLER (CC) (MM23-33-05), SEE PWR DIAGRAM



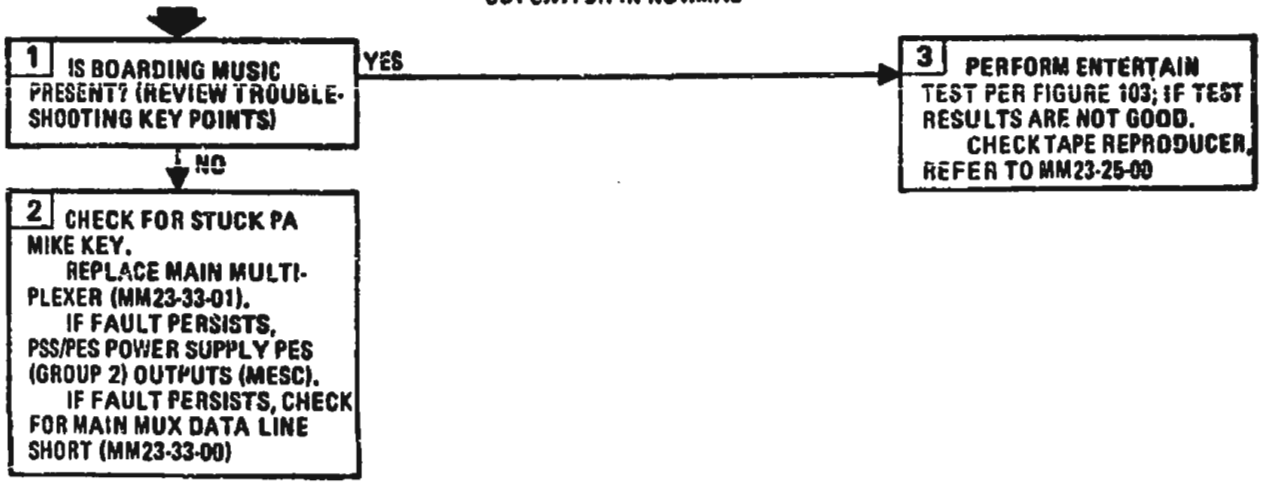
TROUBLESHOOTING KEY POINTS:
1 IF DECODER, SEU, OR CC REPLACEMENT DOES NOT FIX FAULT, REFER TO FIGURE 104 FOR PSS TEST AND FAULT ISOLATION.

M1-0000-23-3335

Flashing Reading Lights/Cycling Air Valves
Figure 115

PREREQUISITES
ELEC PWR (24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB'S ON POWER SUPPLY, CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

NO AUDIO ENTERTAINMENT AND/OR BOARDING MUSIC


1 IS BOARDING MUSIC PRESENT? (REVIEW TROUBLE-SHOOTING KEY POINTS)
YES
3 PERFORM ENTERTAIN TEST PER FIGURE 103; IF TEST RESULTS ARE NOT GOOD. CHECK TAPE REPRODUCER, REFER TO MM23-25-00
NO
2 CHECK FOR STUCK PA MIKE KEY.
REPLACE MAIN MULTI-PLEXER (MM23-33-01).
IF FAULT PERSISTS, PSS/PES POWER SUPPLY PES (GROUP 2) OUTPUTS (MESC).
IF FAULT PERSISTS, CHECK FOR MAIN MUX DATA LINE SHORT (MM23-33-00)

TROUBLESHOOTING KEY POINTS:

1 NO PES AND BOARDING MUSIC PROBABLE CAUSES, MAIN MUX/POWER SUPPLY FAULT OR STUCK PA MIKE KEY OR MAIN MUX DATA LINE FAILURE (SHORTED).

2 NO PES BUT BOARDING MUSIC OK, PROBABLE CAUSE TAPE REPRODUCER.

3 AIRCRAFT WITH PRE-RECORDED ANNOUNCEMENTS CHECK FOR STUCK PA MIKE KEY.

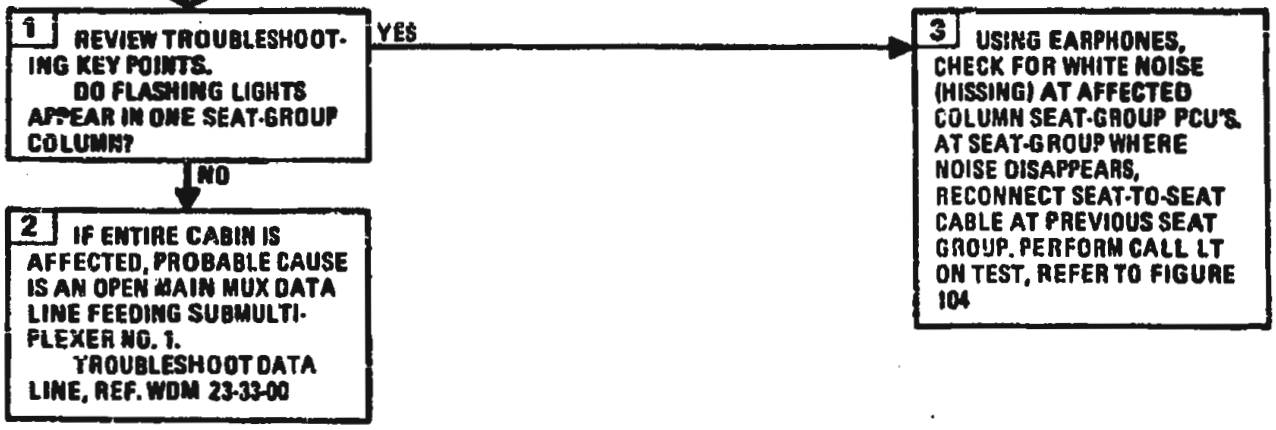
M1-0002-23-3336

R No Audio Entertainment and/or Boarding Music
R Figure 116

PREREQUISITES

~~ELEC PWR (24-00-00)~~
MID ELECTRICAL SERVICE CENTER COOLING ON (21-25-00)
CB'S IN: 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER – PASS. SERV MDL – ALL CB'S ON POWER SUPPLY ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

RANGING (RANDOM-RINGING) CHIMES AND FLASHING CALL LIGHTS


1 REVIEW TROUBLESHOOTING KEY POINTS. DO FLASHING LIGHTS APPEAR IN ONE SEAT-GROUP COLUMN?
YES
3 USING EARPHONES, CHECK FOR WHITE NOISE (HISSING) AT AFFECTED COLUMN SEAT-GROUP PCU'S. AT SEAT-GROUP WHERE NOISE DISAPPEARS, RECONNECT SEAT-TO-SEAT CABLE AT PREVIOUS SEAT GROUP. PERFORM CALL LT ON TEST, REFER TO FIGURE 104
NO
2 IF ENTIRE CABIN IS AFFECTED, PROBABLE CAUSE IS AN OPEN MAIN MUX DATA LINE FEEDING SUBMULTIPLEXER NO. 1. TROUBLESHOOT DATA LINE, REF. WDM 23-33-00

TROUBLESHOOTING KEY POINTS:

1 SINGLE COLUMN FAULT PROBABLE CAUSE IS OPEN/LOOSE SEAT-TO-SEAT COAX CABLE.

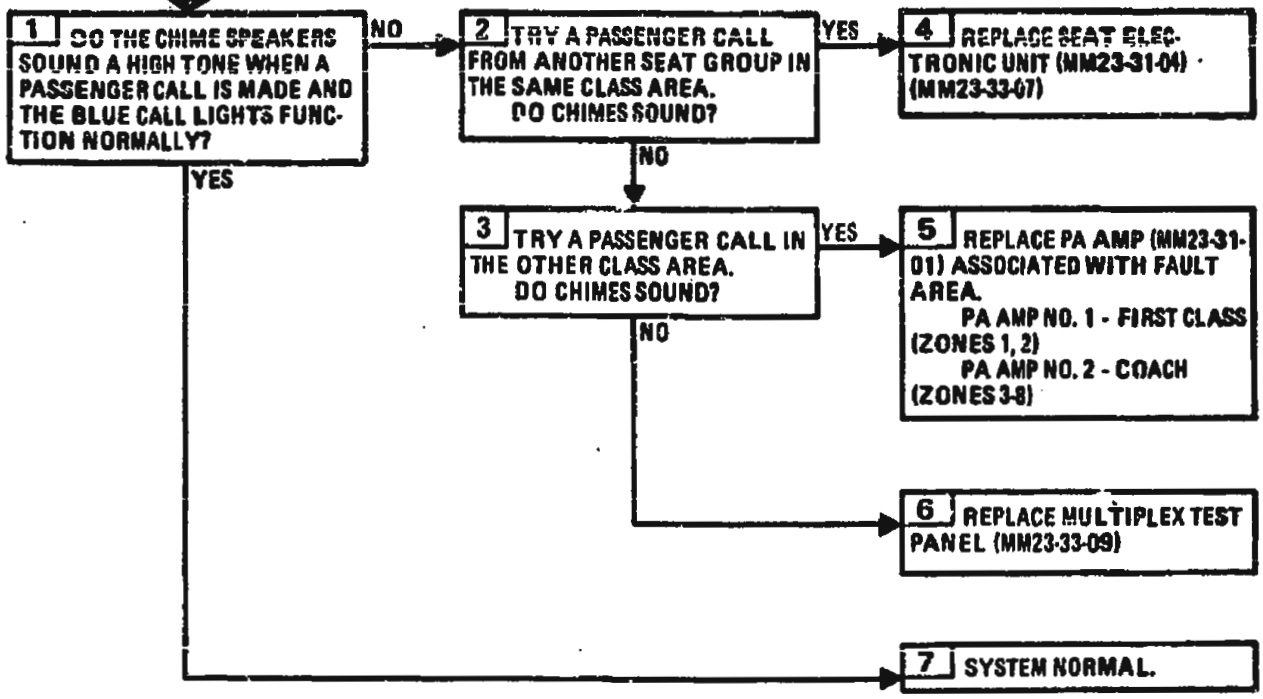
2 IF ALL SEAT-GROUP COLUMNS ARE AFFECTED, PROBABLE CAUSE IS OPEN/LOOSE MAIN MUX DATA LINE TO SUB MUX 1.

M1–0000–23–3337

Ranging (Random-Ringing) Chimes and Flashing Call Lights
Figure 117

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING ON (MM21-26-00)
CB'S IN: 1A15, 1A16, 2C8, 2D11 (2D10 ON SOME A/C)
GALLEY RIGHT PANEL: POWER SUPPLY MULTIPLEXED PASS. SERVICE AND COMPT CONT FANS
GALLEY LEFT PANEL: POWER–PASS. SERV MDL
ON POWER SUPPLY CHECK ALL CB'S CLOSED AND POWER CB1 SWITCH IN NORMAL

BLUE CALL LIGHTS NORMAL/ HIGH CHIMES DO NOT OPERATE

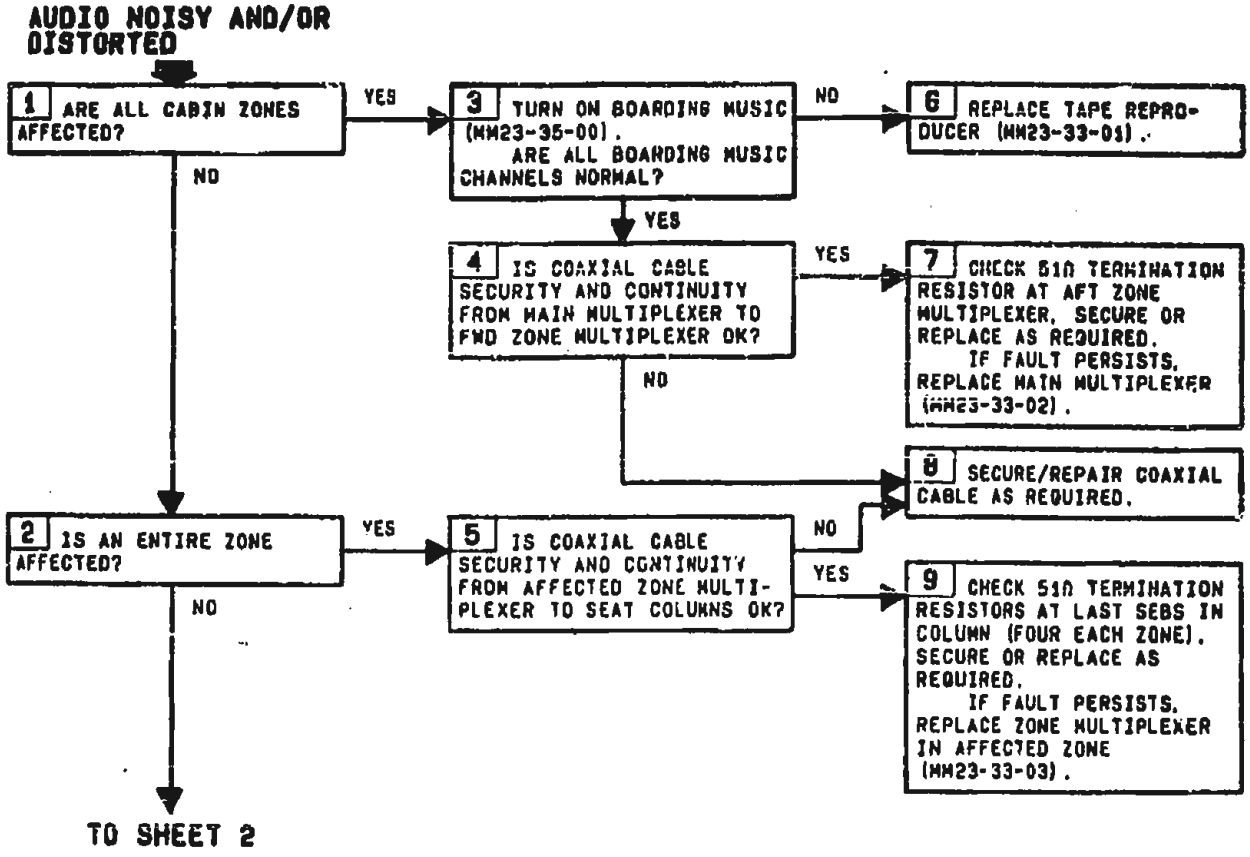

1 DO THE CHIME SPEAKERS SOUND A HIGH TONE WHEN A PASSENGER CALL IS MADE AND THE BLUE CALL LIGHTS FUNCTION NORMALLY?
NO
2 TRY A PASSENGER CALL FROM ANOTHER SEAT GROUP IN THE SAME CLASS AREA. DO CHIMES SOUND?
YES
4 REPLACE SEAT ELECTRONIC UNIT (MM23-31-04) (MM23-33-07)
NO
3 TRY A PASSENGER CALL IN THE OTHER CLASS AREA. DO CHIMES SOUND?
YES
5 REPLACE PA AMP (MM23-31-01) ASSOCIATED WITH FAULT AREA. PA AMP NO. 1 - FIRST CLASS (ZONES 1, 2) PA AMP NO. 2 - COACH (ZONES 3-8)
NO
6 REPLACE MULTIPLEX TEST PANEL (MM23-33-09)
YES
7 SYSTEM NORMAL.

NOTE
ENSURE THAT MULTIPLEX TEST PANEL CHIME SWITCH IS ON PRIOR TO STARTING FAULT ISOLATION.

M1–0000–23–3606

High Chimes Do Not Operate
Figure 118

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
MID ELECTRICAL SERVICE CENTER COOLING (MM21-25-00)
ON FE/SO OVERHEAD CB PNL 2D11
ON GALLEY LEFT CB PNL E4, E8, E10-12, F3-8
ON GALLEY RIGHT CB PNL E4 AND E8
PES/PSS TEST SWITCHES IN NORM /1\


AUDIO NOISY AND/OR DISTORTED
1 ARE ALL CABIN ZONES AFFECTED?
YES
NO
3 TURN ON BOARDING MUSIC (MM23-35-00). ARE ALL BOARDING MUSIC CHANNELS NORMAL?
NO
6 REPLACE TAPE REPRODUCER (MM23-33-01).
YES
4 IS COAXIAL CABLE SECURITY AND CONTINUITY FROM MAIN MULTIPLEXER TO FWD ZONE MULTIPLEXER OK?
YES
7 CHECK 51Ω TERMINATION RESISTOR AT AFT ZONE MULTIPLEXER, SECURE OR REPLACE AS REQUIRED. IF FAULT PERSISTS, REPLACE MAIN MULTIPLEXER (MM23-33-02).
NO
8 SECURE/REPAIR COAXIAL CABLE AS REQUIRED.
2 IS AN ENTIRE ZONE AFFECTED?
YES
5 IS COAXIAL CABLE SECURITY AND CONTINUITY FROM AFFECTED ZONE MULTIPLEXER TO SEAT COLUMNS OK?
NO
YES
9 CHECK 51Ω TERMINATION RESISTORS AT LAST SEBS IN COLUMN (FOUR EACH ZONE). SECURE OR REPLACE AS REQUIRED. IF FAULT PERSISTS, REPLACE ZONE MULTIPLEXER IN AFFECTED ZONE (MM23-33-03).
NO
TO SHEET 2

NOTE

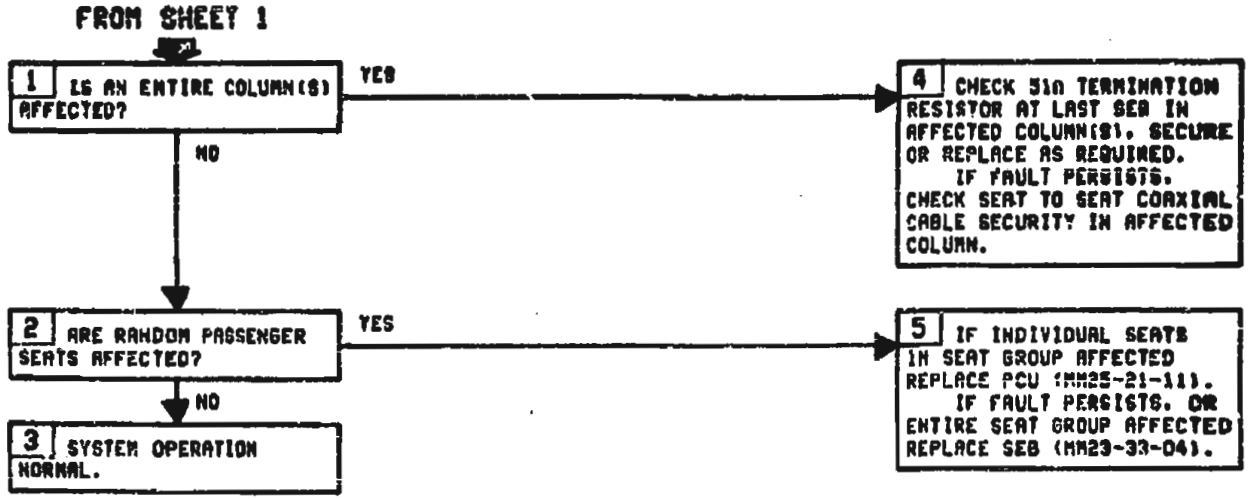
/1\ WITH PES/PSS TEST SWITCHES IN NORM, VERIFY GREEN NORM LIGHT "ON".

M1-0000-23-3847

R Audio Noisy/Distorted (PES)
R Figure 119 (Sheet 1)

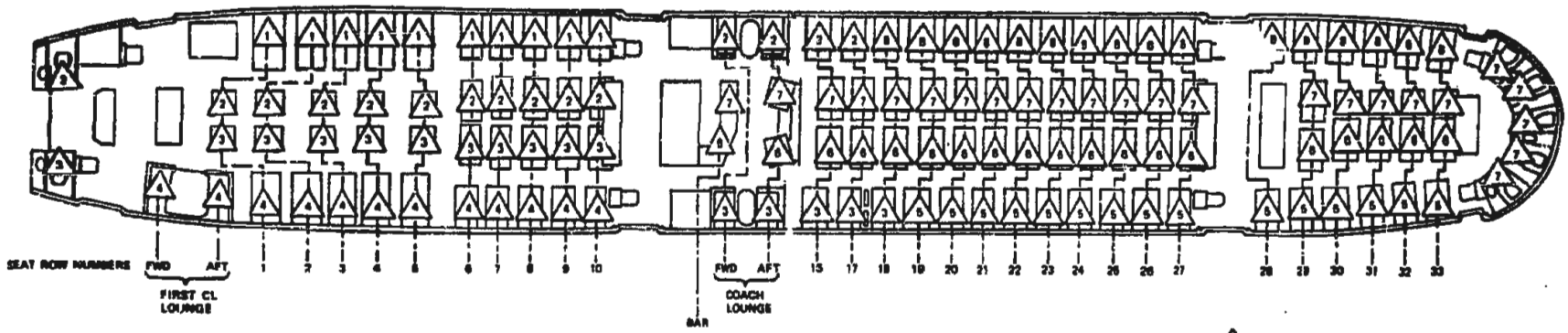
R EFFECTIVITY: ALL
R
005B

PREREQUISITES
SEE SHEET 1

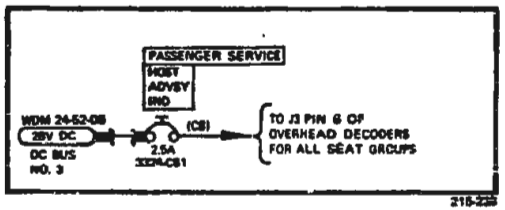

FROM SHEET 1
1 IS AN ENTIRE COLUMN(S) AFFECTED?
YES
NO
2 ARE RANDOM PASSENGER SEATS AFFECTED?
YES
NO
3 SYSTEM OPERATION NORMAL.
4 CHECK 51Ω TERMINATION RESISTOR AT LAST SEB IN AFFECTED COLUMN(S). SECURE OR REPLACE AS REQUIRED.
IF FAULT PERSISTS. CHECK SEAT TO SEAT COAXIAL CABLE SECURITY IN AFFECTED COLUMN.
5 IF INDIVIDUAL SEATS IN SEAT GROUP AFFECTED REPLACE PCU (MM25-21-11).
IF FAULT PERSISTS. OR ENTIRE SEAT GROUP AFFECTED REPLACE SEB (MM23-33-04).

MI-0001-23-3158

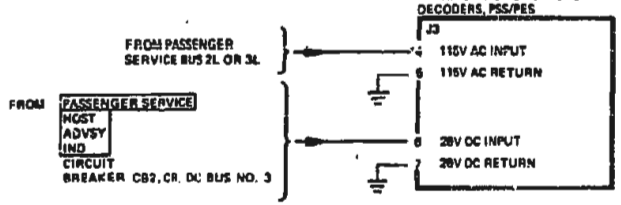
R Audio Noisy/Distorted (PES)
R Figure 119 (Sheet 2)



FE/SD OVERHEAD CIRCUIT BREAKER PANEL CB2



TYPICAL – ALL OVERHEAD DECODERS, PSS/PES



9 WITH PES/PSS INSTALLED THE FOLLOWING VOLTAGES APPLY AT THE:

SEU	+25V DC (25.5 TO 28.5) + 5V DC (5.0 TO 12.0) –25V DC (25.5 TO 28.0)
DECODER	+ 5V (4.5 TO ...) –25V (25.5 TO 27.0)

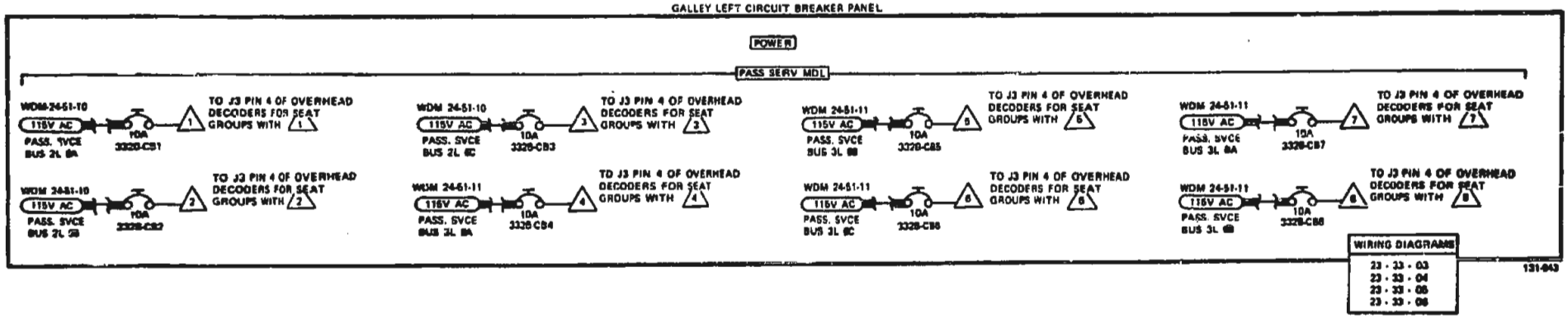
WITH PSS INSTALLED ONLY:

SEU	+ 5V (5.1 TO 6.5)
DECODER	SAME AS ABOVE

NOTE

IF ALL SEATS ARE DISCONNECTED FROM THE MUX POWER SUPPLY CIRCUIT, THE POWER SUPPLY WILL TURN OFF DUE TO NO LOAD CONDITION

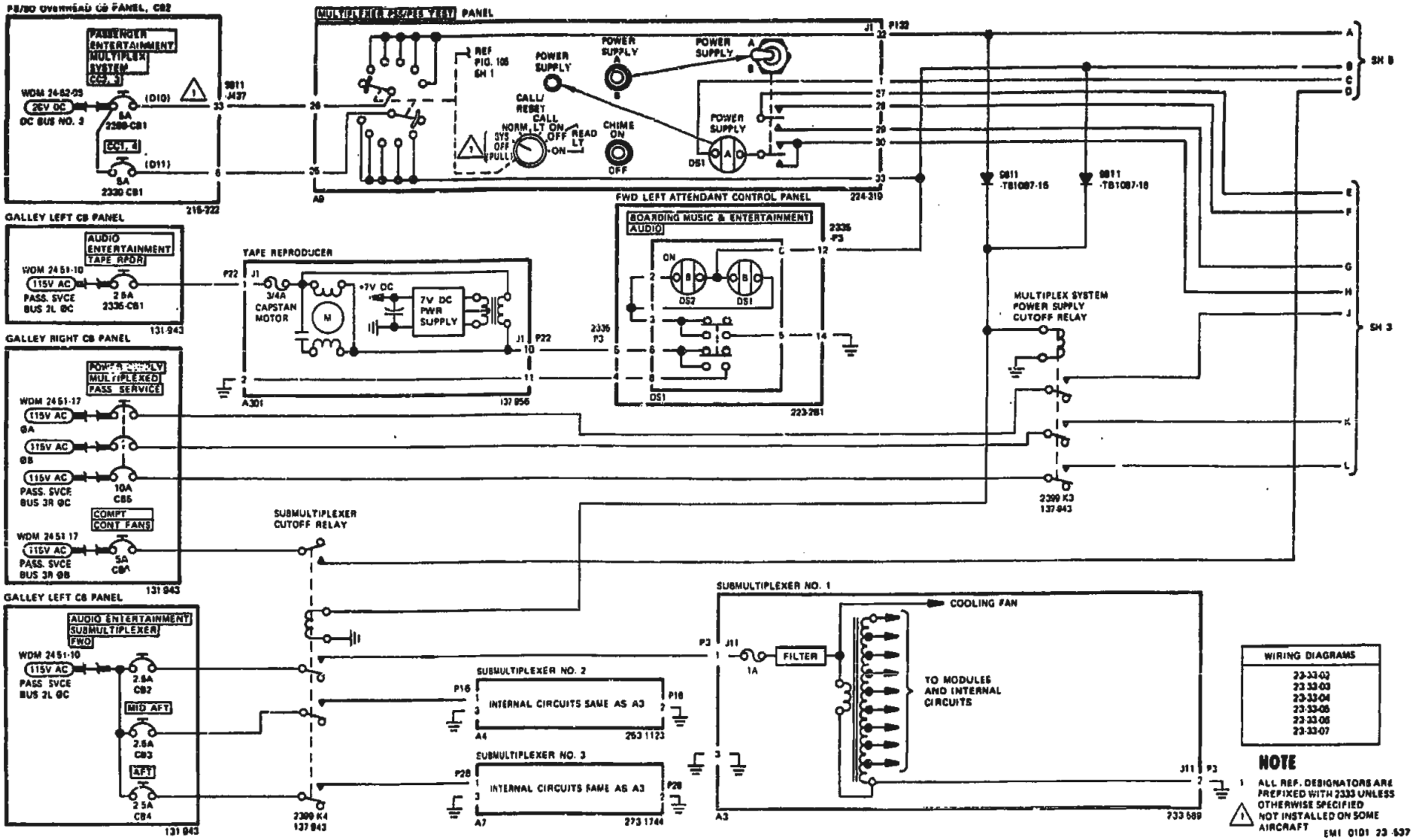
GALLEY LEFT CIRCUIT BREAKER PANEL



EM1-5002-23-321

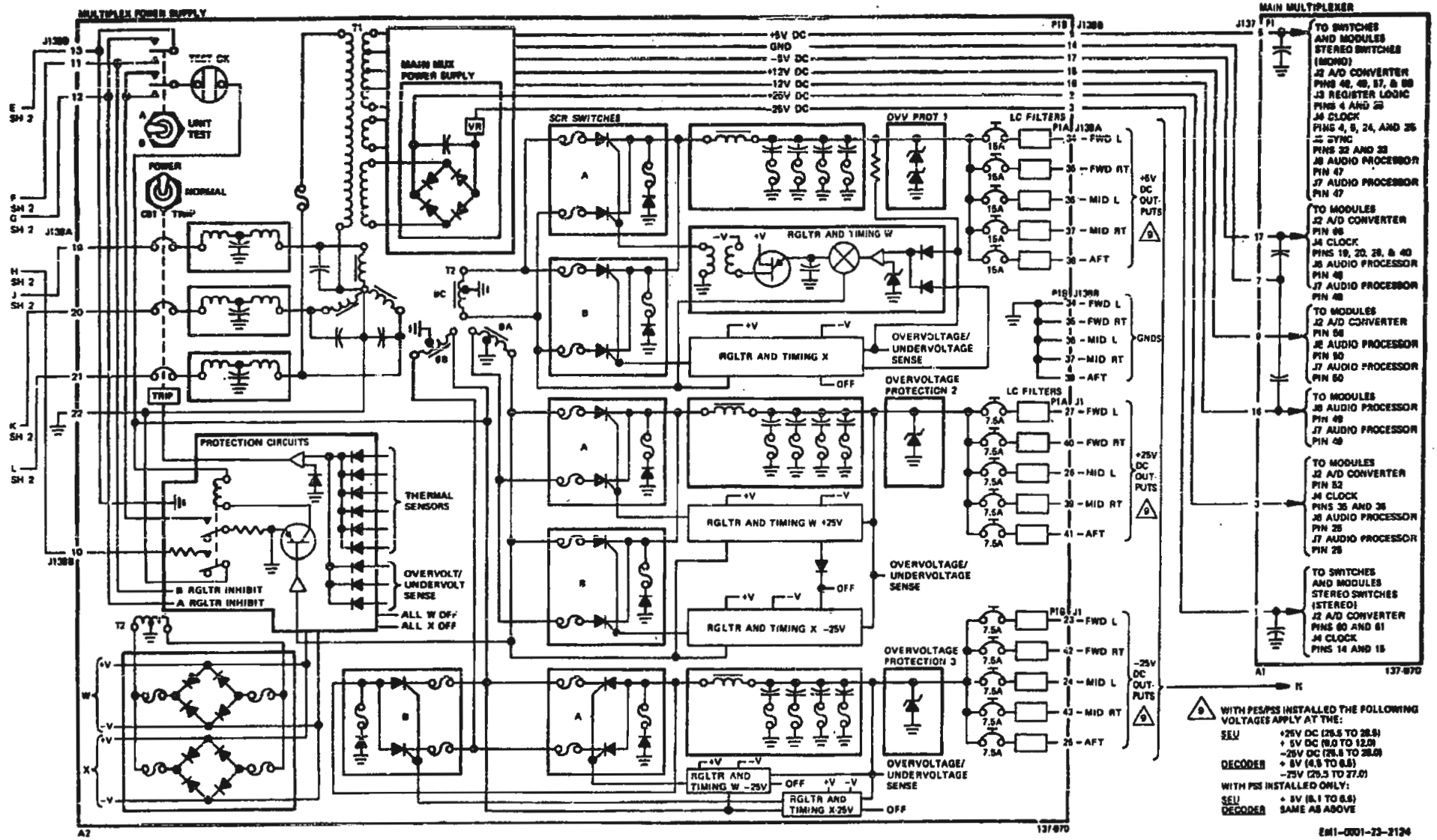
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: 001-031
R
005B



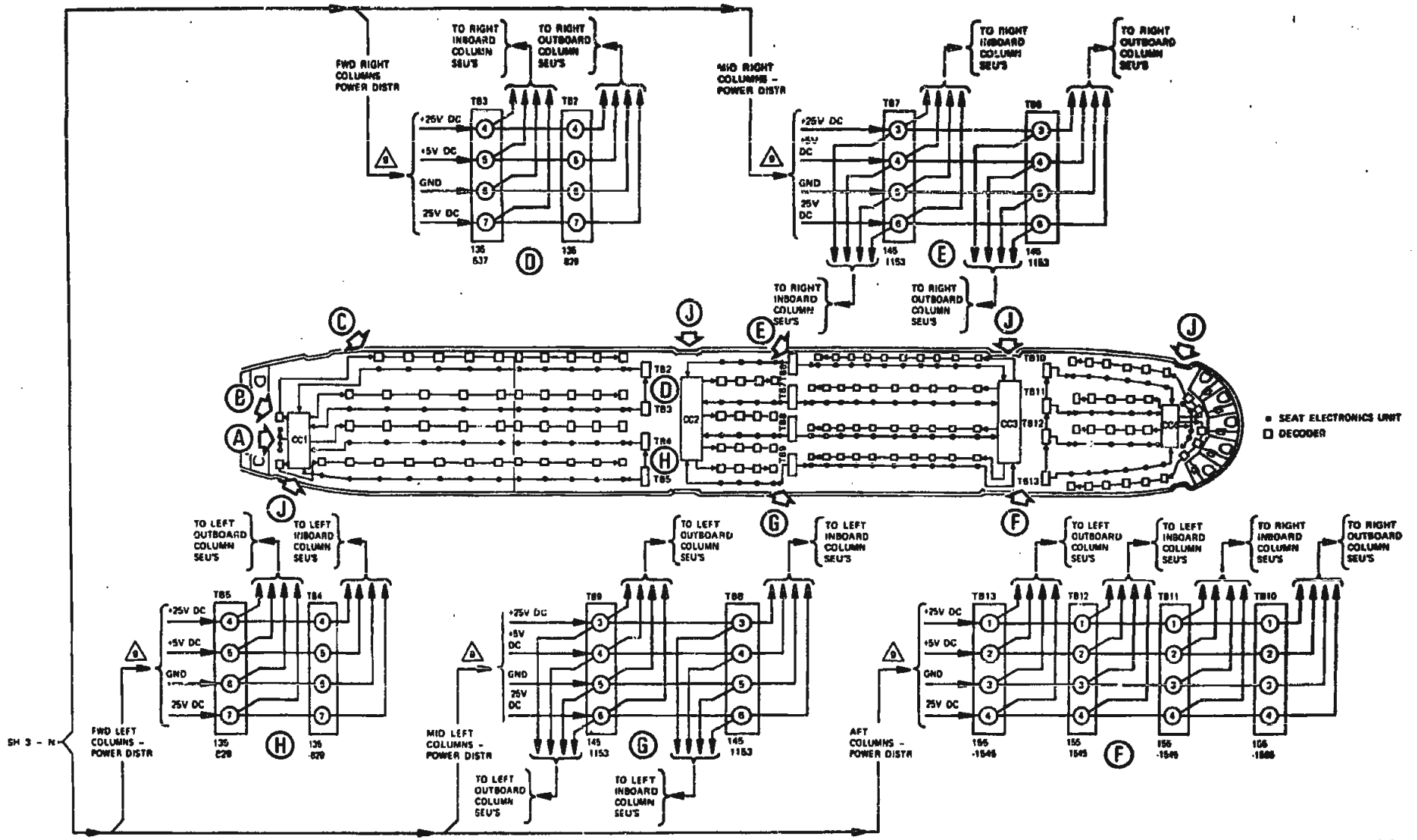
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 2)

R EFFECTIVITY: 001-031
R
005B


MULTIPLEX POWER SUPPLY
MAIN MUX POWER SUPPLY
SCR SWITCHES
OVV PROT 1
LC FILTERS
RGLTR AND TIMING W
RGLTR AND TIMING X
OVERVOLTAGE/ UNDERVOLTAGE SENSE
OVERVOLTAGE PROTECTION 2
RGLTR AND TIMING W +25V
RGLTR AND TIMING X -25V
OVERVOLTAGE PROTECTION 3
RGLTR AND TIMING W -25V
RGLTR AND TIMING X-25V
PROTECTION CIRCUITS
THERMAL SENSORS
OVERVOLT/ UNDERVOLT SENSE
B RGLTR INHIBIT
A RGLTR INHIBIT
ALL W OFF
ALL X OFF
TEST OK
UNIT TEST
POWER
NORMAL
TRIP
+5V DC
GND
-5V DC
+12V DC
-12V DC
+25V DC
-25V DC
+5V DC OUTPUTS
GNDS
+25V DC OUTPUTS
-25V DC OUTPUTS
MAIN MULTIPLEXER
TO SWITCHES AND MODULES STEREO SWITCHES (MONO)
J2 A/D CONVERTER PINS 48, 49, 57, & 58
J3 REGISTER LOGIC PINS 4 AND 23
J4 CLOCK PINS 4, 5, 24, AND 25
J5 SYNC PINS 32 AND 33
J6 AUDIO PROCESSOR PIN 47
J7 AUDIO PROCESSOR PIN 47
TO MODULES
J2 A/D CONVERTER PIN 66
J4 CLOCK PINS 19, 20, 28, & 40
J6 AUDIO PROCESSOR PIN 48
J7 AUDIO PROCESSOR PIN 48
J2 A/D CONVERTER PIN 56
J6 AUDIO PROCESSOR PIN 50
J7 AUDIO PROCESSOR PIN 50
J6 AUDIO PROCESSOR PIN 49
J7 AUDIO PROCESSOR PIN 49
J2 A/D CONVERTER PIN 52
J4 CLOCK PINS 35 AND 36
J6 AUDIO PROCESSOR PIN 25
J7 AUDIO PROCESSOR PIN 26
TO SWITCHES AND MODULES STEREO SWITCHES (STEREO)
J2 A/D CONVERTER PINS 60 AND 61
J4 CLOCK PINS 14 AND 15
WITH PES/PSS INSTALLED THE FOLLOWING VOLTAGES APPLY AT THE:
SEU +25V DC (26.5 TO 28.5)
+ 5V DC (10.0 TO 12.0)
-25V DC (26.5 TO 28.0)
DECODER + 5V (4.5 TO 6.5)
-25V (25.5 TO 27.0)
WITH PSS INSTALLED ONLY:
SEU + 5V (6.1 TO 6.5)
DECODER SAME AS ABOVE
EM1-0001-23-2124

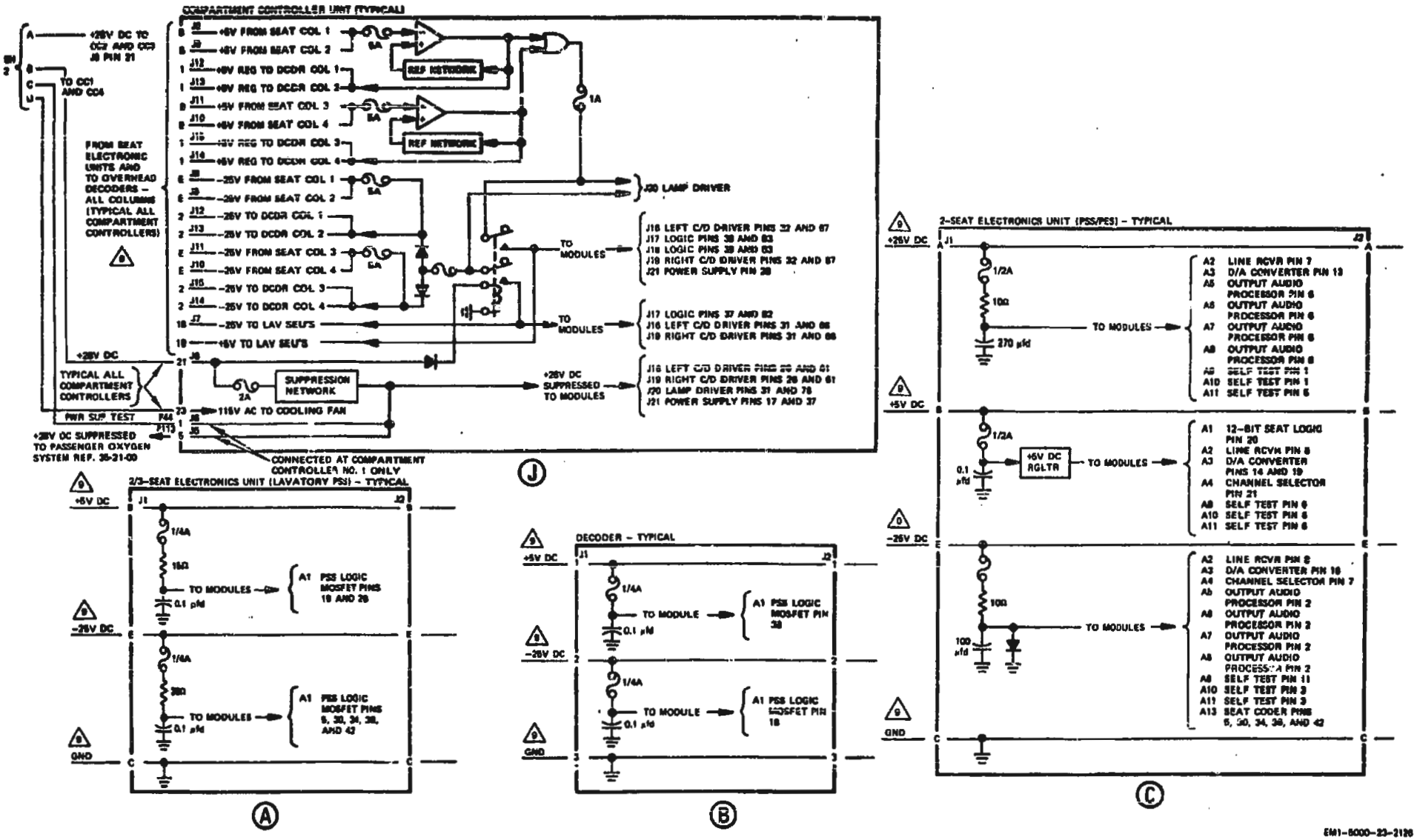
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 3)

R EFFECTIVITY: 001-031
R
005B



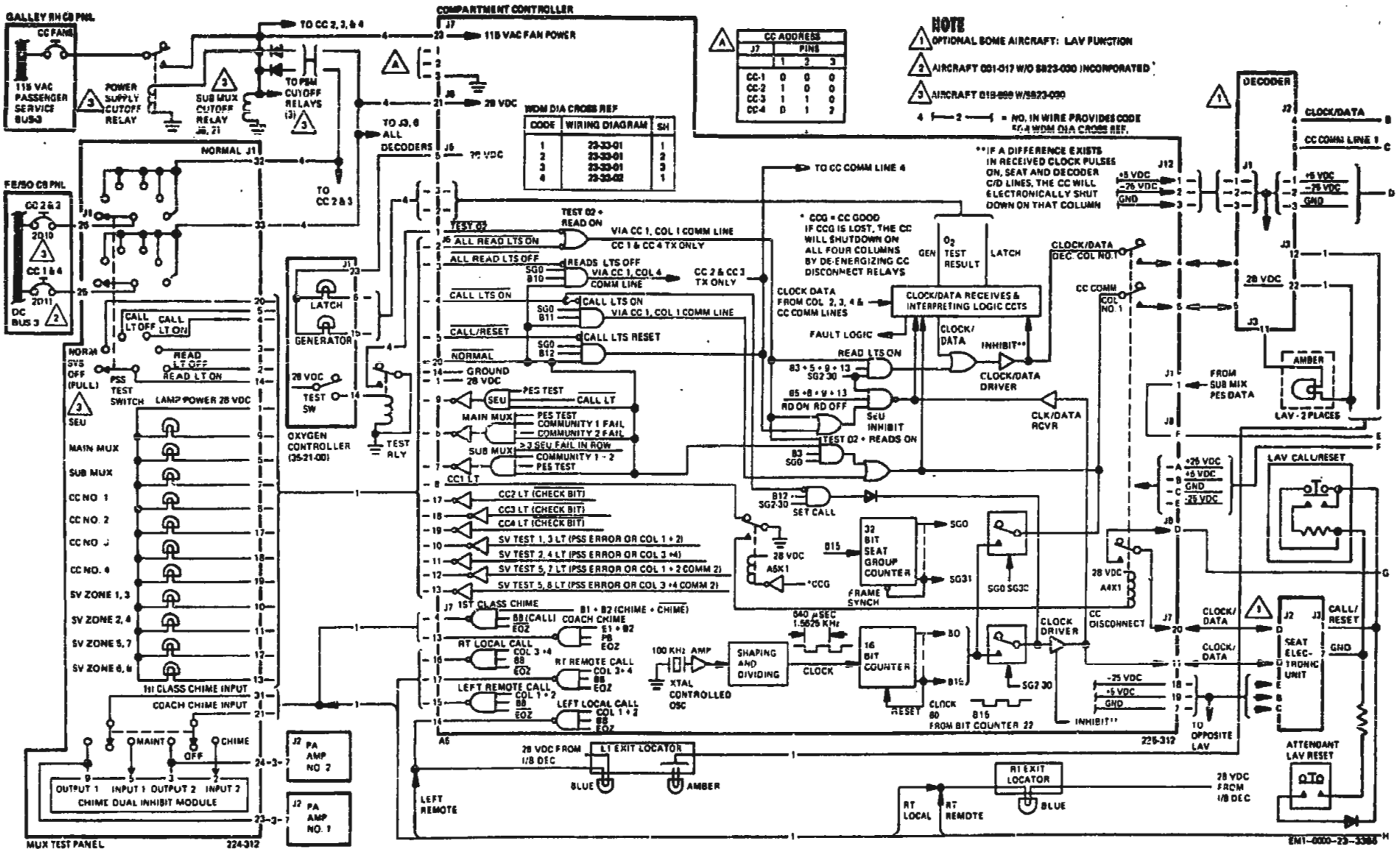
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 4)

R EFFECTIVITY: 001-031
R
OC5B

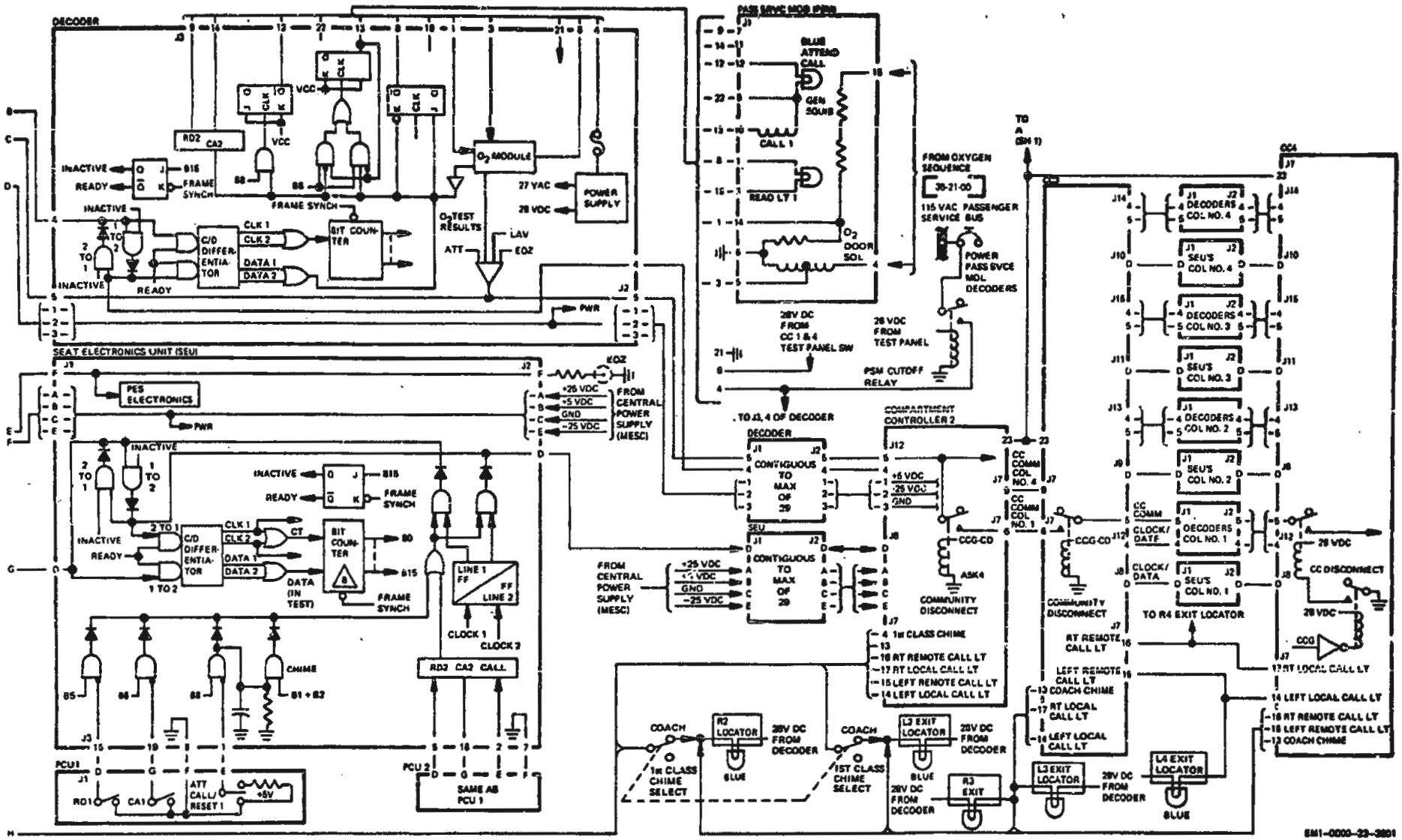

COMPARTMENT CONTROLLER UNIT (TYPICAL)
+28V DC TO CC2 AND CC3 J8 PIN 21
TO CC1 AND CC4
FROM SEAT ELECTRONIC UNITS AND TO OVERHEAD DECODERS – ALL COLUMNS (TYPICAL ALL COMPARTMENT CONTROLLERS)
+5V FROM SEAT COL 1
+5V FROM SEAT COL 2
+5V REG TO DCDR COL 1
+5V REG TO DCDR COL 2
+5V FROM SEAT COL 3
+5V FROM SEAT COL 4
+5V REG TO DCDR COL 3
+5V REG TO DCDR COL 4
-25V FROM SEAT COL 1
-25V FROM SEAT COL 2
-25V TO DCDR COL 1
-25V TO DCDR COL 2
-25V FROM SEAT COL 3
-25V FROM SEAT COL 4
-25V TO DCDR COL 3
-25V TO DCDR COL 4
-25V TO LAV SEU'S
+5V TO LAV SEU'S
REF NETWORK
REF NETWORK
5A
1A
J20 LAMP DRIVER
TO MODULES
J18 LEFT C/D DRIVER PINS 32 AND 67
J17 LOGIC PINS 38 AND 63
J18 LOGIC PINS 39 AND 63
J19 RIGHT C/D DRIVER PINS 32 AND 67
J21 POWER SUPPLY PIN 39
TO MODULES
J17 LOGIC PINS 37 AND 62
J16 LEFT C/D DRIVER PINS 31 AND 66
J19 RIGHT C/D DRIVER PINS 31 AND 66
+28V DC
TYPICAL ALL COMPARTMENT CONTROLLERS
SUPPRESSION NETWORK
2A
+28V DC SUPPRESSED TO MODULES
J16 LEFT C/D DRIVER PINS 26 AND 61
J19 RIGHT C/D DRIVER PINS 26 AND 61
J20 LAMP DRIVER PINS 31 AND 76
J21 POWER SUPPLY PINS 17 AND 37
PWR SUP TEST
115V AC TO COOLING FAN
+28V DC SUPPRESSED TO PASSENGER OXYGEN SYSTEM REF. 35-21-00
CONNECTED AT COMPARTMENT CONTROLLER NO. 1 ONLY
J
2/3-SEAT ELECTRONICS UNIT (LAVATORY PSU) – TYPICAL
+5V DC
-28V DC
GND
1/4A
16Ω
TO MODULES
0.1 μfd
A1 PSS LOGIC MOSFET PINS 18 AND 26
28Ω
A1 PSS LOGIC MOSFET PINS 5, 30, 34, 38, AND 42
A
DECODER – TYPICAL
+5V DC
-28V DC
GND
TO MODULE
A1 PSS LOGIC MOSFET PIN 38
A1 PSS LOGIC MOSFET PIN 18
B
2-SEAT ELECTRONICS UNIT (PSS/PES) – TYPICAL
+28V DC
+5V DC
-28V DC
GND
1/2A
10Ω
270 μfd
TO MODULES
A2 LINE RCVR PIN 7
A3 D/A CONVERTER PIN 13
A5 OUTPUT AUDIO PROCESSOR PIN 6
A6 OUTPUT AUDIO PROCESSOR PIN 6
A7 OUTPUT AUDIO PROCESSOR PIN 6
A8 OUTPUT AUDIO PROCESSOR PIN 6
A9 SELF TEST PIN 1
A10 SELF TEST PIN 1
A11 SELF TEST PIN 6
+5V DC REGLTR
0.1 μfd
A1 12-BIT SEAT LOGIC PIN 20
A2 LINE RCVR PIN 8
A3 D/A CONVERTER PINS 14 AND 19
A4 CHANNEL SELECTOR PIN 21
A8 SELF TEST PIN 6
A10 SELF TEST PIN 6
A11 SELF TEST PIN 6
100
100 μfd
A2 LINE RCVR PIN 2
A3 D/A CONVERTER PIN 10
A4 CHANNEL SELECTOR PIN 7
A5 OUTPUT AUDIO PROCESSOR PIN 2
A6 OUTPUT AUDIO PROCESSOR PIN 2
A7 OUTPUT AUDIO PROCESSOR PIN 2
A8 OUTPUT AUDIO PROCESSOR PIN 2
A9 SELF TEST PIN 11
A10 SELF TEST PIN 3
A11 SELF TEST PIN 3
A13 SEAT CODER PINS 5, 30, 34, 38, AND 42
C
EM1-6000-23-2126

PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 5)

R EFFECTIVITY: 001-031
R
005B

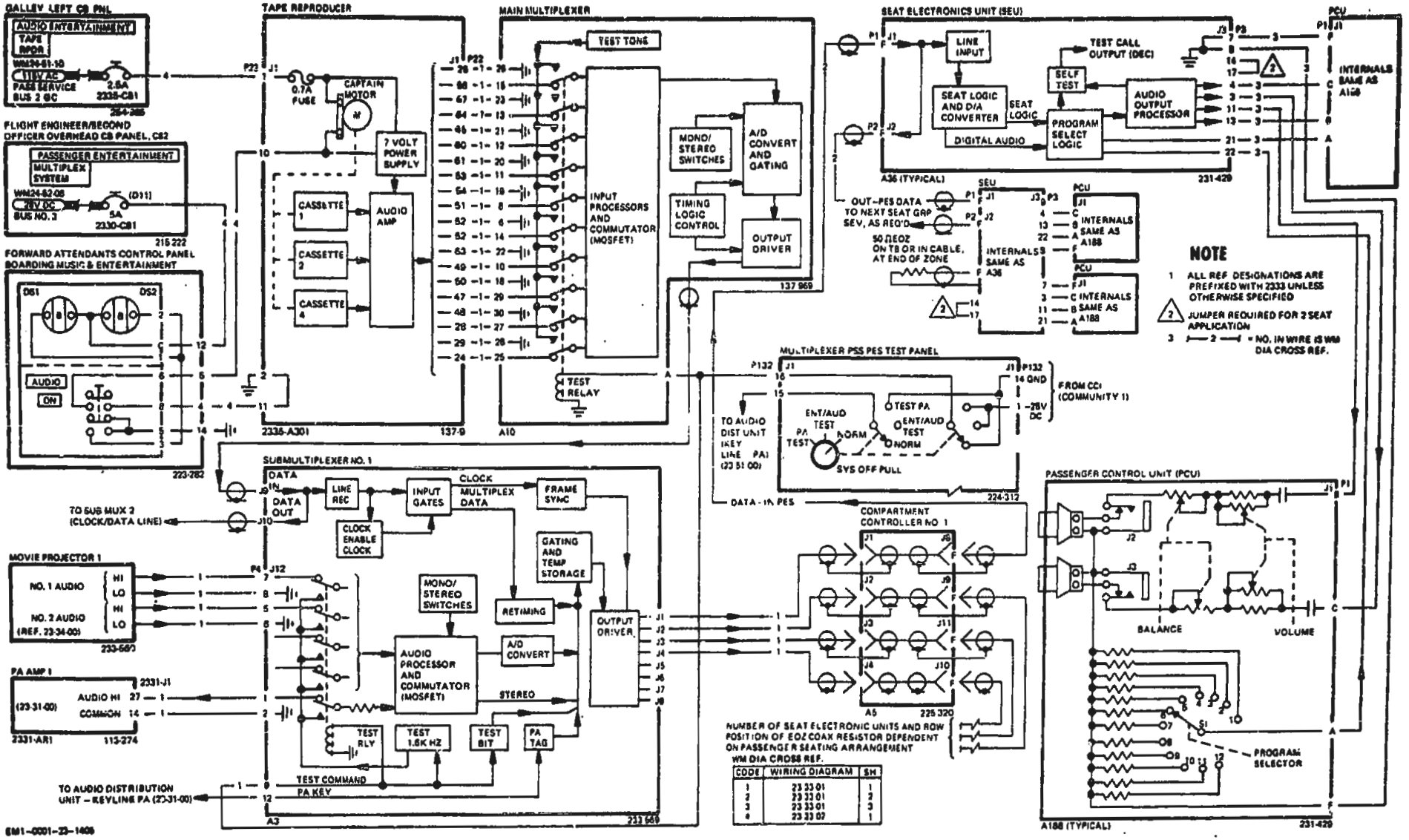


PSS Functional Schematic
SCHEM 2 (Sheet 1)



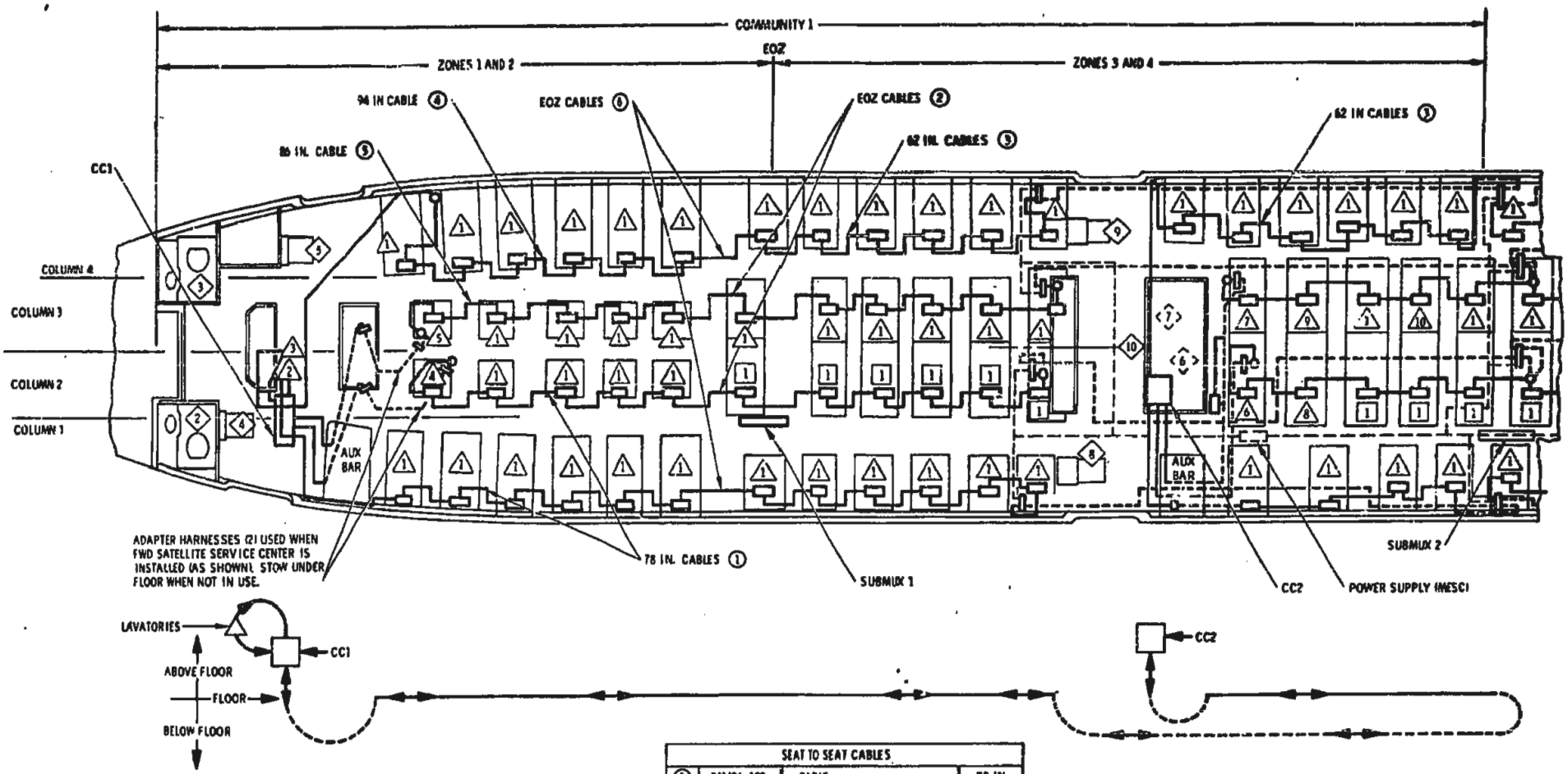
PSS Functional Schematic
SCHEM 2 (Sheet 2)

R
R
005B EFFECTIVITY: 001-031



R PES Functional Schematic
R SCHEM 3

EFFECTIVITY: 001-031



SEAT TO SEAT CABLES			
(1)	741426-123	CABLE	78 IN.
(2)	741426-119	EOZ CABLE/CLASS DIVIDER	76 IN.
(3)	741426-125	CABLE	62 IN.
(4)	741426-117	CABLE	94 IN.
(5)	741426-121	CABLE	86 IN.
(6)	741426-111	EOZ CABLE/CLASS DIVIDER	102 IN.

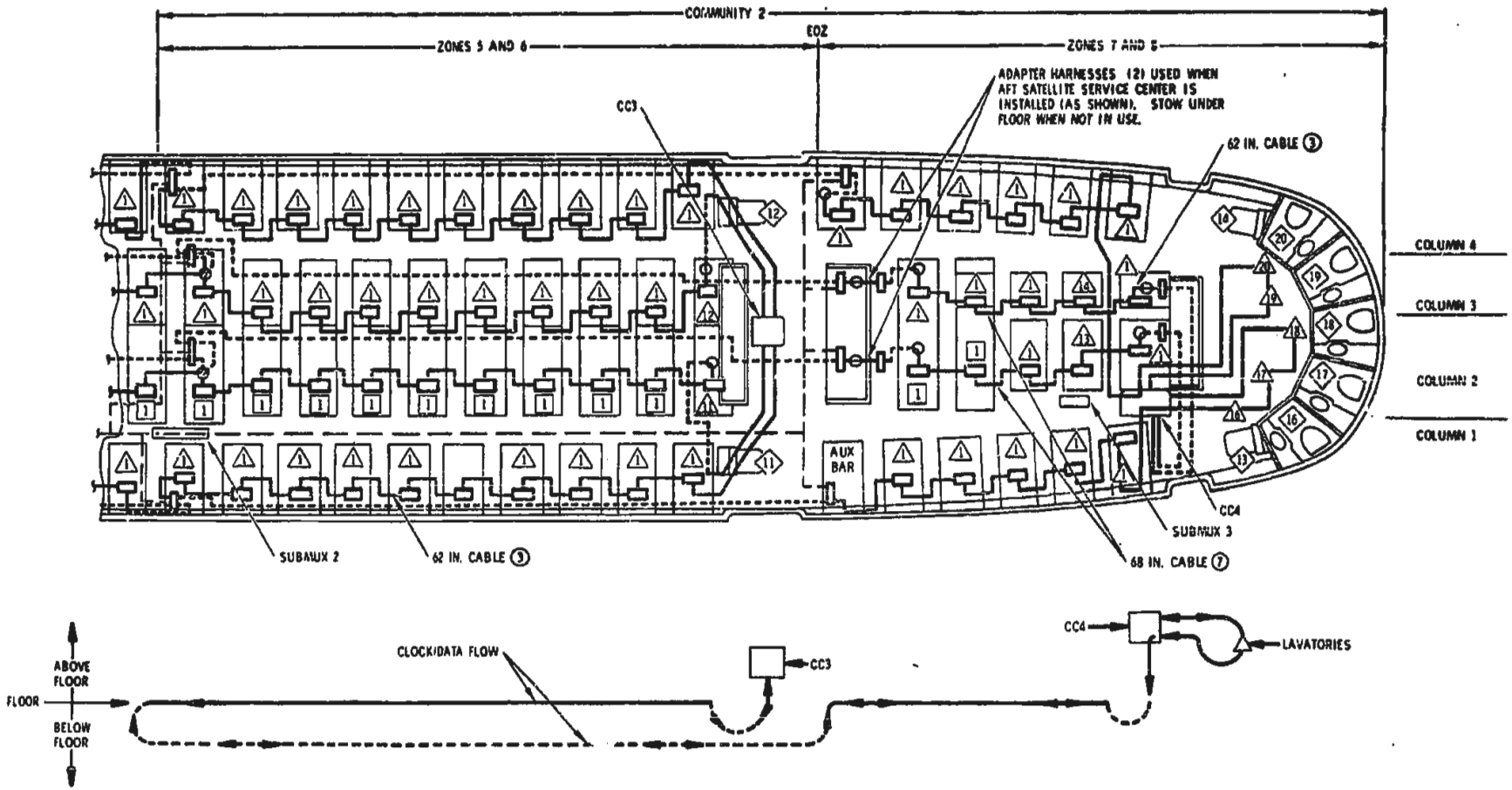
WARNING
SEE SHEET 3

HARNESS AND CABLE CODE
——— SHIPS WIRING FROM COMPARTMENT CONTROLLER TO SEU, SEU TO SEU, AND SEAT-TO-SEAT CABLES-ABOVE FLOOR
— — — SHIPS WIRING FROM POWER SUPPLY - UNDER FLOOR
- - - - - - SHIPS WIRING FOR MUX DATA AND COAX - UNDER FLOOR

EM1-0001-23-316

C
C PSS/PES Component Location and Cabling
SCHEM 4 (Sheet 1)

R EFFECTIVITY: 001-023
R
005B



WARNING
SEE SHEET 3

CAUTION
SEE SHEET 3

SEAT-TO-SEAT CABLES			
③	741426-125	CABLE	62 INCHES
⑦	741426-107	CABLE	68 INCHES
①, ②, AND ④ - ⑥	SEE SHEET 1		

HARNESS AND CABLE CODE

- ——— SHIPS WIRING FROM COMPARTMENT CONTROLLER TO SEU, SEU TO SEU, AND SEAT-TO-SEAT CABLES - ABOVE FLOOR
- – – – SHIPS WIRING FROM POWER SUPPLY - UNDER FLOOR
- ------- SHIPS WIRING FOR MUX DATA AND COAX - UNDER FLOOR

G 2301
EM1-0001-23-317

C
C PSS/PES Component Location and Cabling
SCHEM 4 (Sheet 2)

R EFFECTIVITY: 001-023
R
0058

NOTE

1. SINGLE OR DOUBLE PSS/PES SEAT GROUPS, EACH WITH ONE OR TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER, AND DBL PSM.
2. SYMBOL NOT USED.
3. FORWARD LEFT LAVATORY PSS SEU AND DECODER.
4. FORWARD LEFT LAVATORY ATTENDANT CALL SWITCH AND LIGHTS, AND LAVATORY OXYGEN MODULE WITH TEST LIGHTS.
5. FORWARD RIGHT LAVATORY PSS SEU AND DECODER.
6. FORWARD RIGHT LAVATORY ATTENDANT CALL SWITCH AND LIGHTS, AND LAVATORY OXYGEN MODULE WITH TEST LIGHTS.
7. FIRST CLASS LOUNGE PSS/PES SEAT GROUP WITH ONE SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST LIGHT OUTPUT, AND PSM.
8. FORWARD LEFT (FIRST CLASS) ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
9. FIRST CLASS LOUNGE PSS/PES SEAT GROUP WITH ONE SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST LIGHT OUTPUT, AND PSM.
10. FORWARD RIGHT (FIRST CLASS) ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
11. AND (7) COACH PSS/PES SEAT GROUP, WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND DBL PSM.
12. LOWER GALLEY LEFT ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
13. LOWER GALLEY RIGHT ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
14. (6) AND (11) COACH PSS/PES SEAT GROUPS, EACH WITH THREE SEAT ARM PCU, ONE TRIPLE SEU, CORRESPONDING OVERHEAD TRIPLE DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND TRIPLE PSM.
15. MID LEFT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
16. MID RIGHT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
17. COACH PSS/PES SEAT GROUP, WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT AND DBL PSM.
18. UPPER GALLEY ATTENDANT OXYGEN MODULE TEST LIGHTS.
19. TRIPLE COACH PSS/PES SEAT GROUPS, EACH WITH THREE SEAT ARM PCU, ONE TRIPLE SEU, CORRESPONDING OVERHEAD TRIPLE DECODER AND TRIPLE PSM.
20. COACH PSS/PES SEAT GROUPS WITH TWO SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND PSM
21. MID-AFT LEFT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
22. MID-AFT RIGHT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
23. COACH PSS/PES SEAT GROUP WITH TWO SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT AND PSM.
24. AFT LEFT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
25. COACH PSS/PES SEAT GROUP WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND DOUBLE PSM.
26. AFT RIGHT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
27. SYMBOL NOT USED.
28. SYMBOL NOT USED.
29. (17), (18), (19), AND (20) AFT LAVATORY GROUPS NO. 1, 2, 3, 4, AND 5. EACH WITH ONE PSS SEU AND ONE DECODER.
30. (17), (18), (19), AND (20) AFT LAVATORIES NO. 1 2, 3, 4, AND 5; EACH WITH ATTENDANT CALL SWITCH AND LIGHTS, AND LAVATORY OXYGEN MODULE WITH TEST LIGHTS.

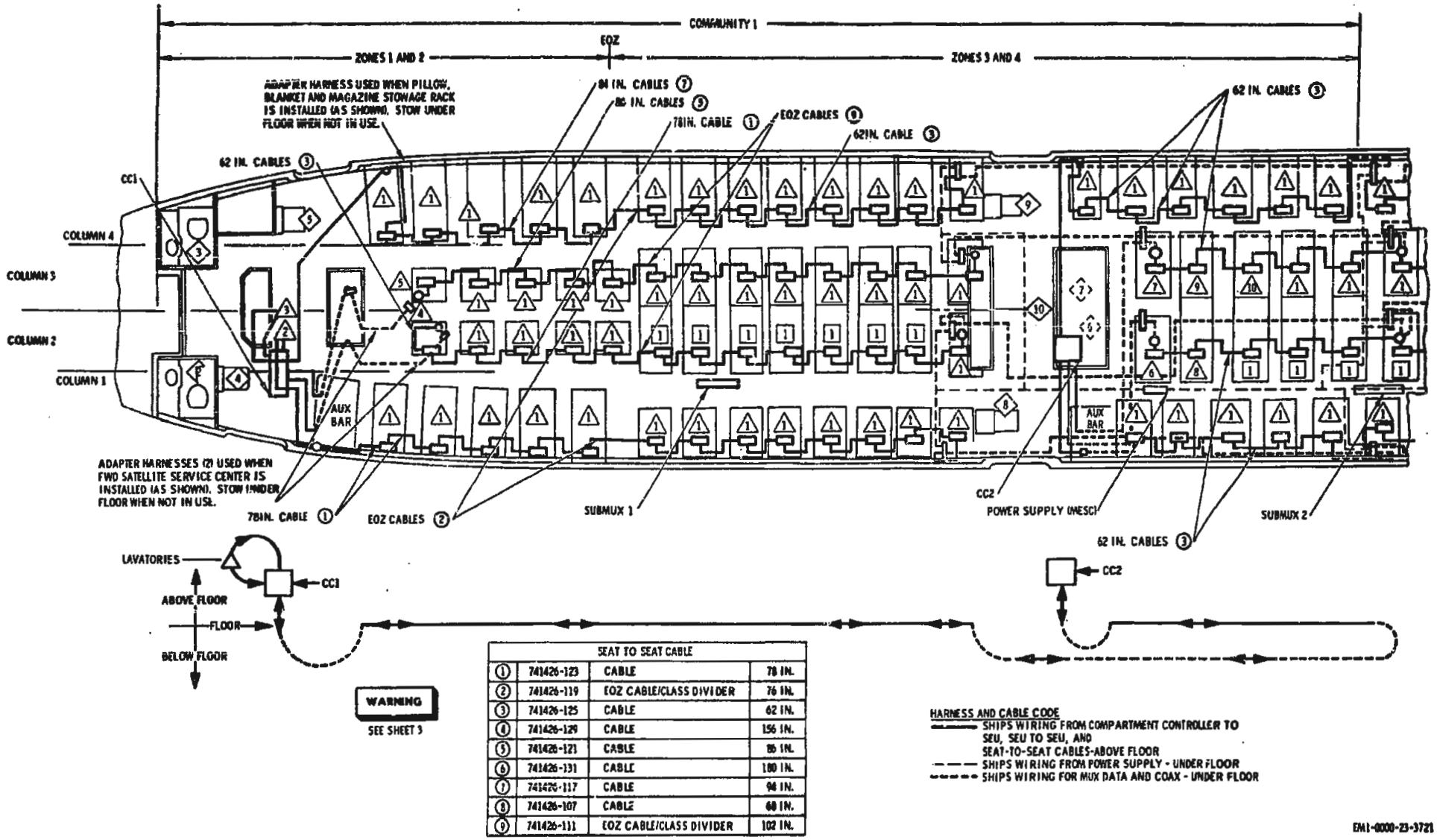
WARNING

- IF ANY SEAT-TO-UNDERFLOOR DISCONNECT CABLES FOR CENTER SEAT COLUMNS 2 OR 3 HAVE BEEN DISCONNECTED OR CONNECTED, VERIFY THAT UNUSED CABLES OR CABLE SLACK STORED UNDER PASSENGER COMPARTMENT FLOOR ARE SECURELY STOWED. LOOSE CABLES OR CABLE SLACK CAN BECOME ENTANGLED WITH FLIGHT CONTROL CABLES.

EM1-0001-23-320

C C PSS/PES Component Location and Cabling
SCHEM 4 (Sheet 3)

R R 005B EFFECTIVITY: 001-023



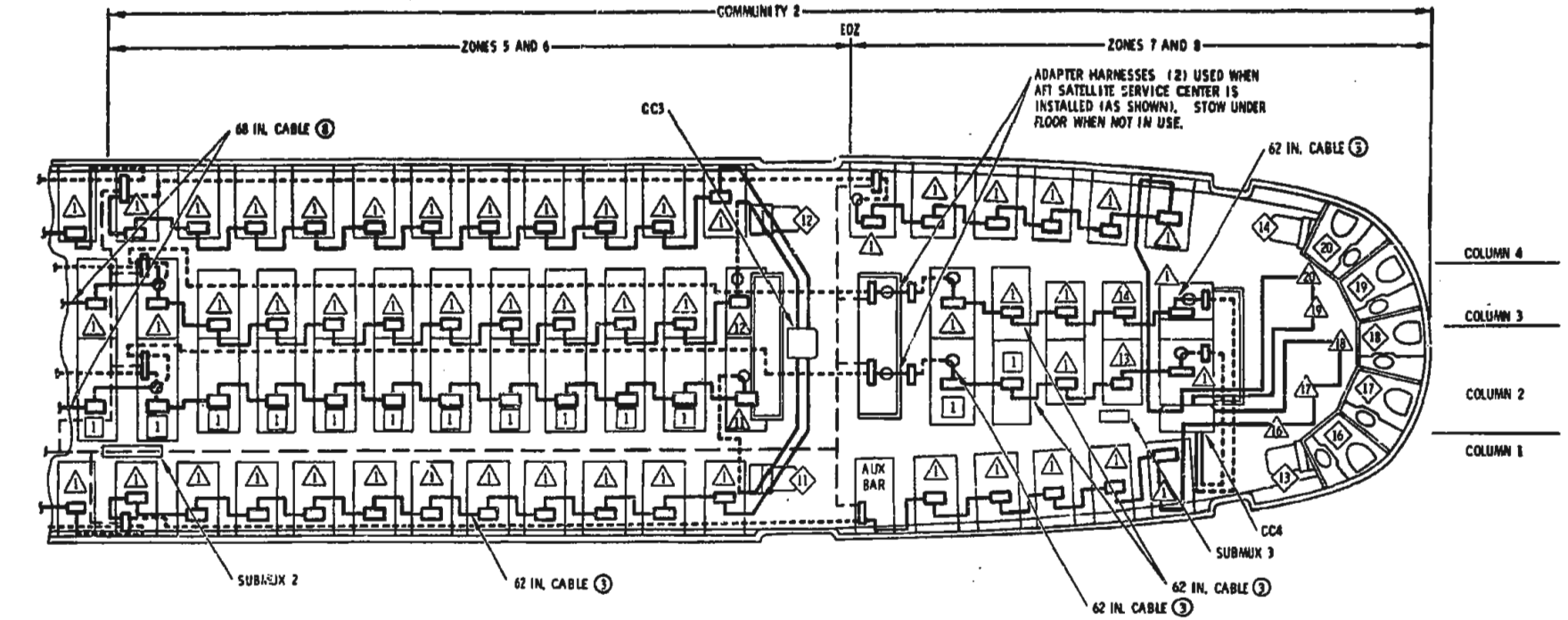
SEAT TO SEAT CABLE			
(1)	741426-123	CABLE	78 IN.
(2)	741426-119	EOZ CABLE/CLASS DIVIDER	76 IN.
(3)	741426-125	CABLE	62 IN.
(4)	741426-129	CABLE	156 IN.
(5)	741426-121	CABLE	86 IN.
(6)	741426-131	CABLE	180 IN.
(7)	741426-117	CABLE	94 IN.
(8)	741426-107	CABLE	60 IN.
(9)	741426-111	EOZ CABLE/CLASS DIVIDER	102 IN.

HARNESS AND CABLE CODE
——— SHIPS WIRING FROM COMPARTMENT CONTROLLER TO SEU, SEU TO SEU, AND SEAT-TO-SEAT CABLES-ABOVE FLOOR
– – – SHIPS WIRING FROM POWER SUPPLY - UNDER FLOOR
– – – – SHIPS WIRING FOR MUX DATA AND COAX - UNDER FLOOR

EMI-0000-23-3721

C C PSS/PES Component Location and Cabling
SCHEM 4 (Sheet 1)

R K 005B EFFECTIVITY: 024-031



WARNING

SEE SHEET 3

SEAT-TO-SEAT CABLES			
③	741426-125	CABLE	62 INCHES
⑧	741426-107	CABLE	68 INCHES
①, ②, AND ④ ⑦, AND ⑨ SEE SHEET 1			

HARNESS AND CABLE CODE

- ——— SHIPS WIRING FROM COMPARTMENT CONTROLLER TO SEU, SEU TO SEU, AND SEAT-TO-SEAT CABLES - ABOVE FLOOR
- – – – SHIPS WIRING FROM POWER SUPPLY - UNDER FLOOR
- ------- SHIPS WIRING FOR MUX DATA AND COAX - UNDER FLOOR

EM1 0000-23-3722

C PSS/PES Component Location and Cabling
C SCHEM 4 (Sheet 2)

R EFFECTIVITY: 024-031
R
005B

NOTE

1. SINGLE OR DOUBLE PSS/PES SEAT GROUPS, EACH WITH ONE OR TWO SEAT ARM PCU. ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER, AND DBL PSM.
2. SYMBOL NOT USED.
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6. FORWARD RIGHT LAVATORY ATTENDANT CALL SWITCH AND LIGHTS, AND LAVATORY OXYGEN MODULE WITH TEST LIGHTS.
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10. FORWARD RIGHT (FIRST CLASS) ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
11. AND 9 COACH PSS/PES SEAT GROUP, WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND DBL PSM.
12. LOWER GALLEY LEFT ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
13. LOWER GALLEY RIGHT ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
14. 11 AND 8 COACH PSS/PES SEAT GROUP, WITH TRIPLE SEAT ARM PCU, ONE TRIPLE SEU, CORRESPONDING OVERHEAD TRIPLE DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND TRIPLE PSM.
15. MID LEFT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
16. MID RIGHT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
17. COACH PSS/PES SEAT GROUP, WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT AND DBL PSM.
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20. COACH PSS/PES SEAT GROUP WITH TWO SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND PSM
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22. MID-AFT RIGHT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
23. COACH PSS/PES SEAT GROUP WITH TWO SEAT ARM PCU, ONE SEU, CORRESPONDING OVERHEAD DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT AND PSM.
24. AFT LEFT CABIN ATTENDANT OXYGEN MODULE AND TEST LIGHTS.
25. COACH PSS/PES SEAT GROUP WITH TWO SEAT ARM PCU, ONE DBL SEU, CORRESPONDING OVERHEAD DBL DECODER WITH ATTENDANT OXYGEN MODULE TEST OUTPUT, AND DOUBLE PSM.
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27. SYMBOL NOT USED.
28. SYMBOL NOT USED.
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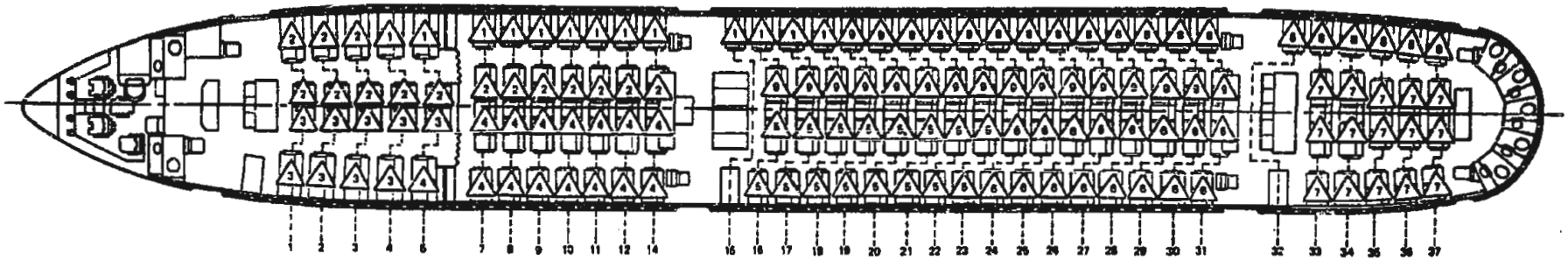
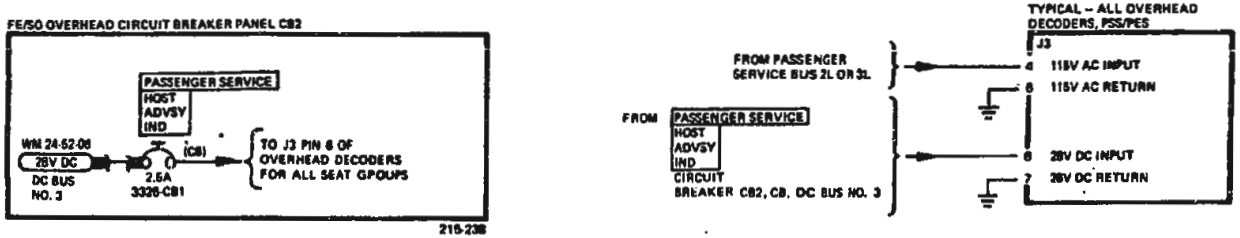
EM1-0000-23-3723

C PSS/PES Component Location and Cabling
C SCHEM 4 (Sheet 3)

R EFFECTIVITY: 024-031
R
005B





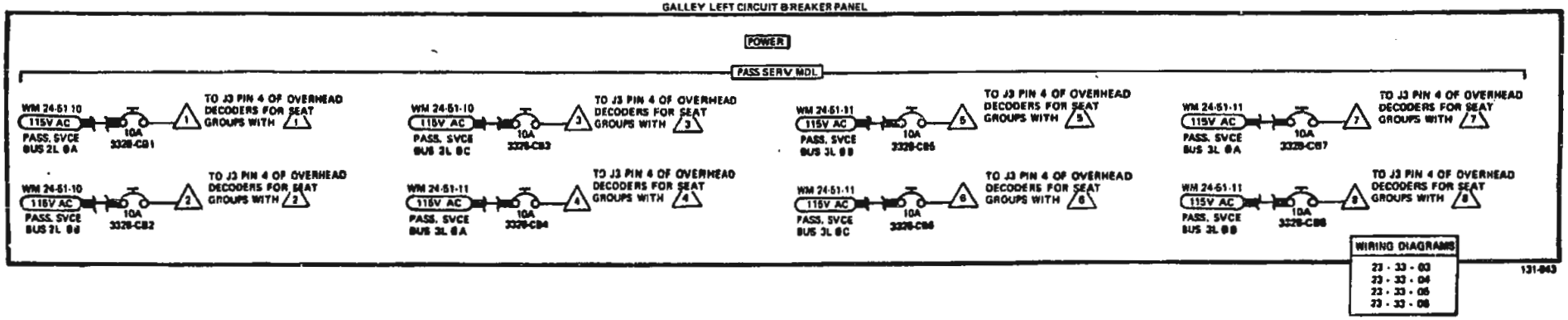
9 WITH PES/PSS INSTALLED THE FOLLOWING VOLTAGES APPLY AT THE:

SEU	+25V DC (25.5 TO 26.5) + 5V DC (9.0 TO 12.0) –25V DC (25.5 TO 26.0)
DECODER	+ 5V (4.5 TO 6.5) –25V (25.5 TO 27.0)

WITH PSS INSTALLED ONLY:

SEU	+ 5V (5.1 TO 6.5)
DECODER	SAME AS ABOVE

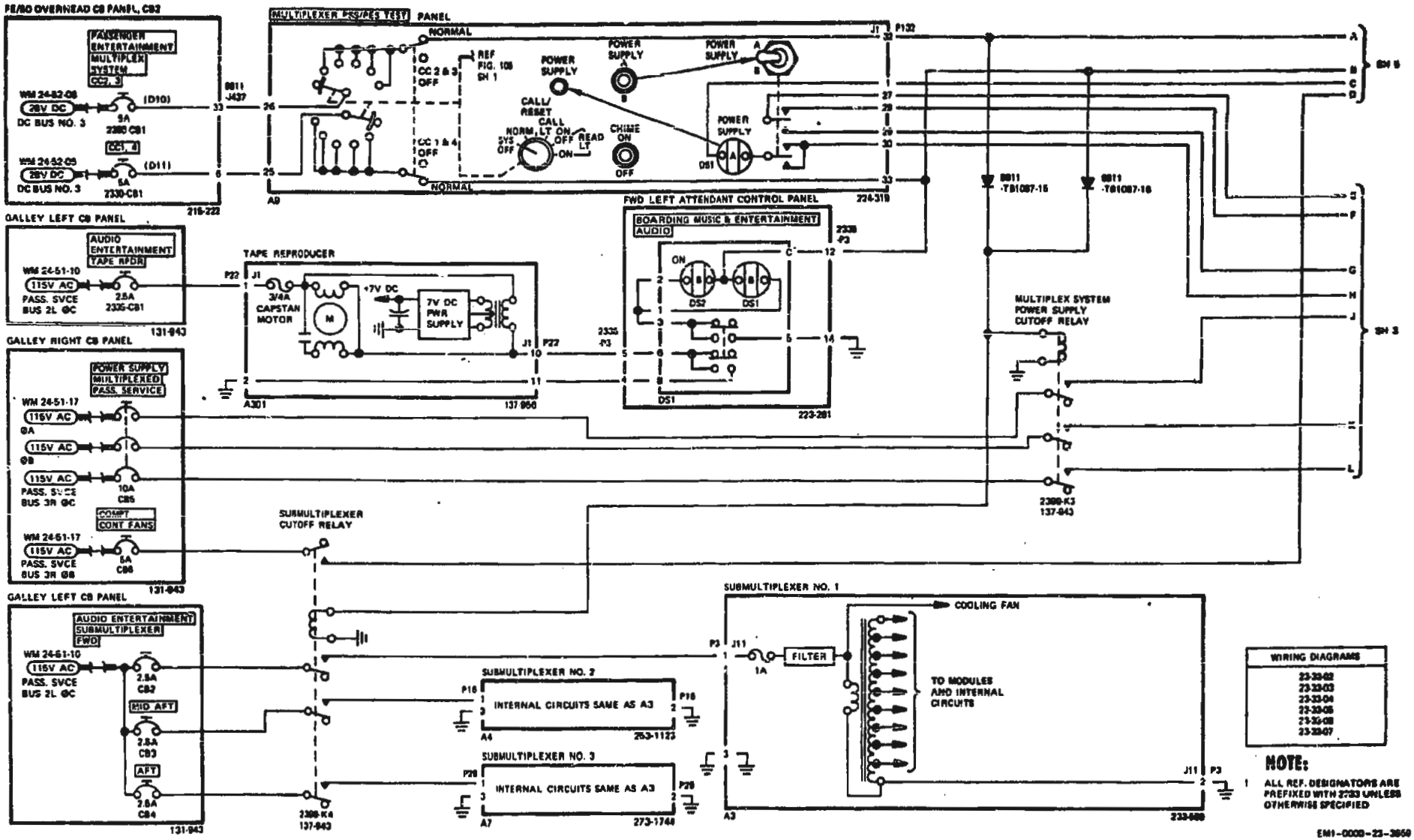
NOTE:
IF ALL SEATS ARE DISCONNECTED FROM THE MUX POWER SUPPLY CIRCUIT, THE POWER SUPPLY WILL TURN OFF DUE TO NO LOAD CONDITION



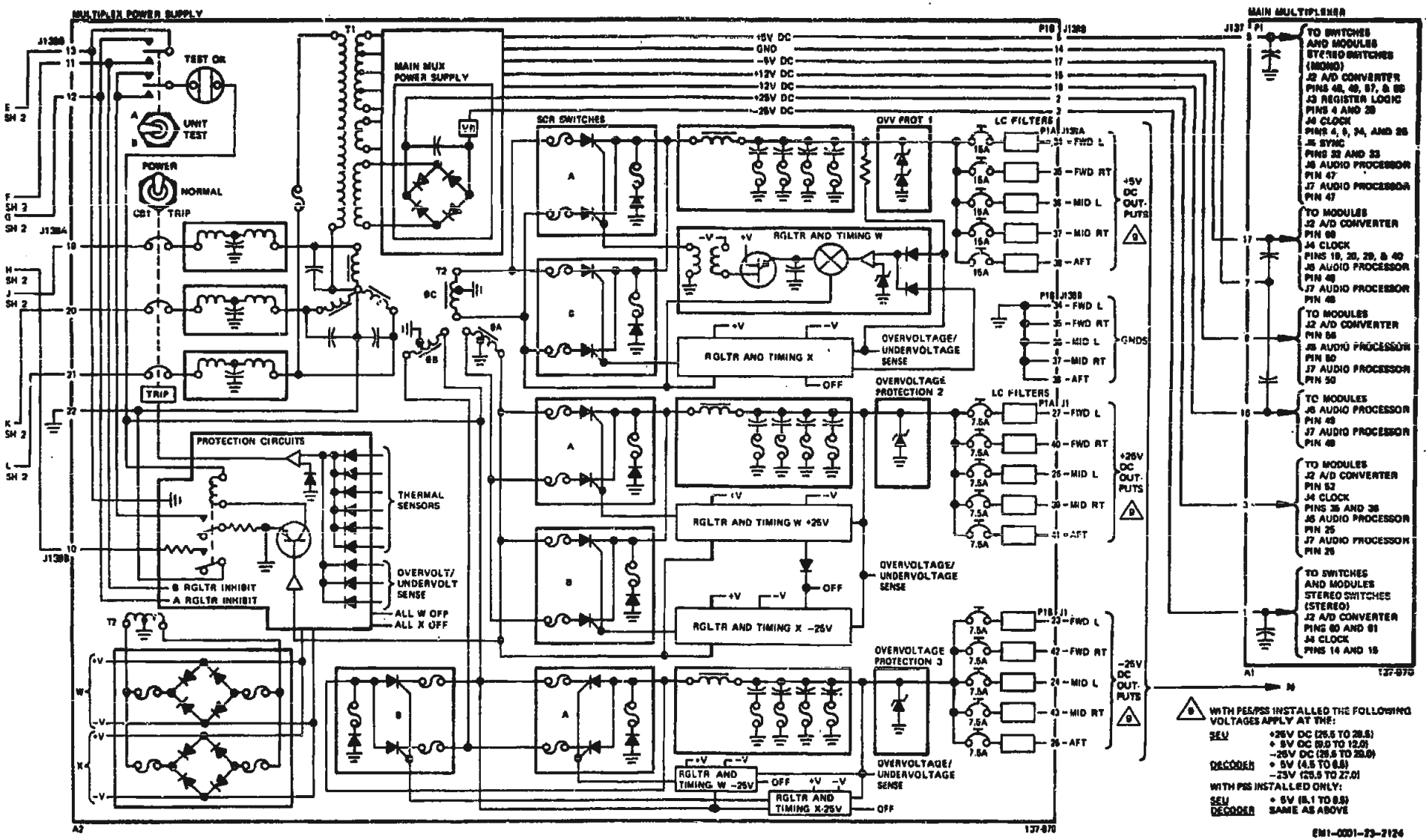
EM1-0000-23-3660

PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 1)

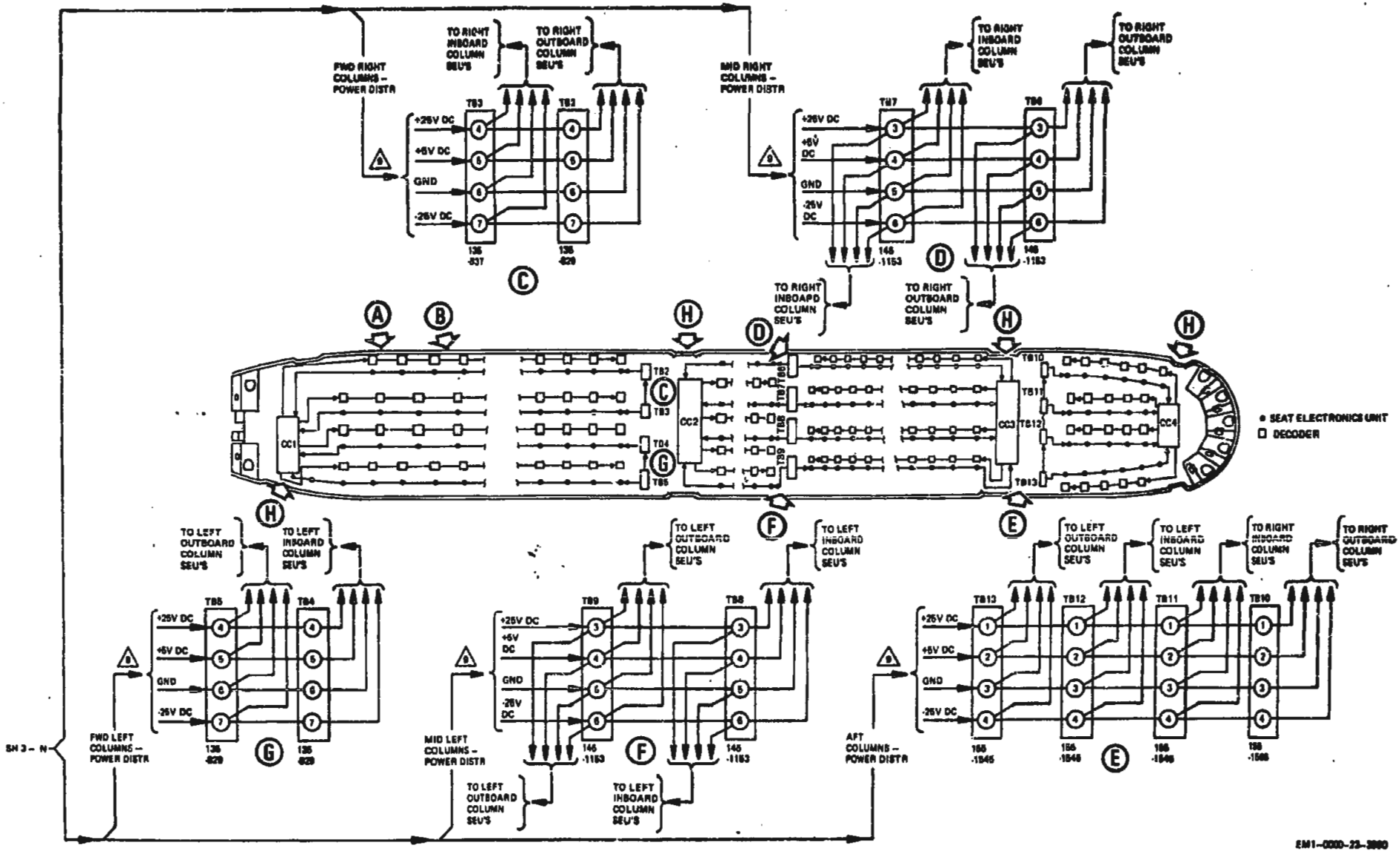
R EFFECTIVITY: 032-999
R
005B



PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 2)

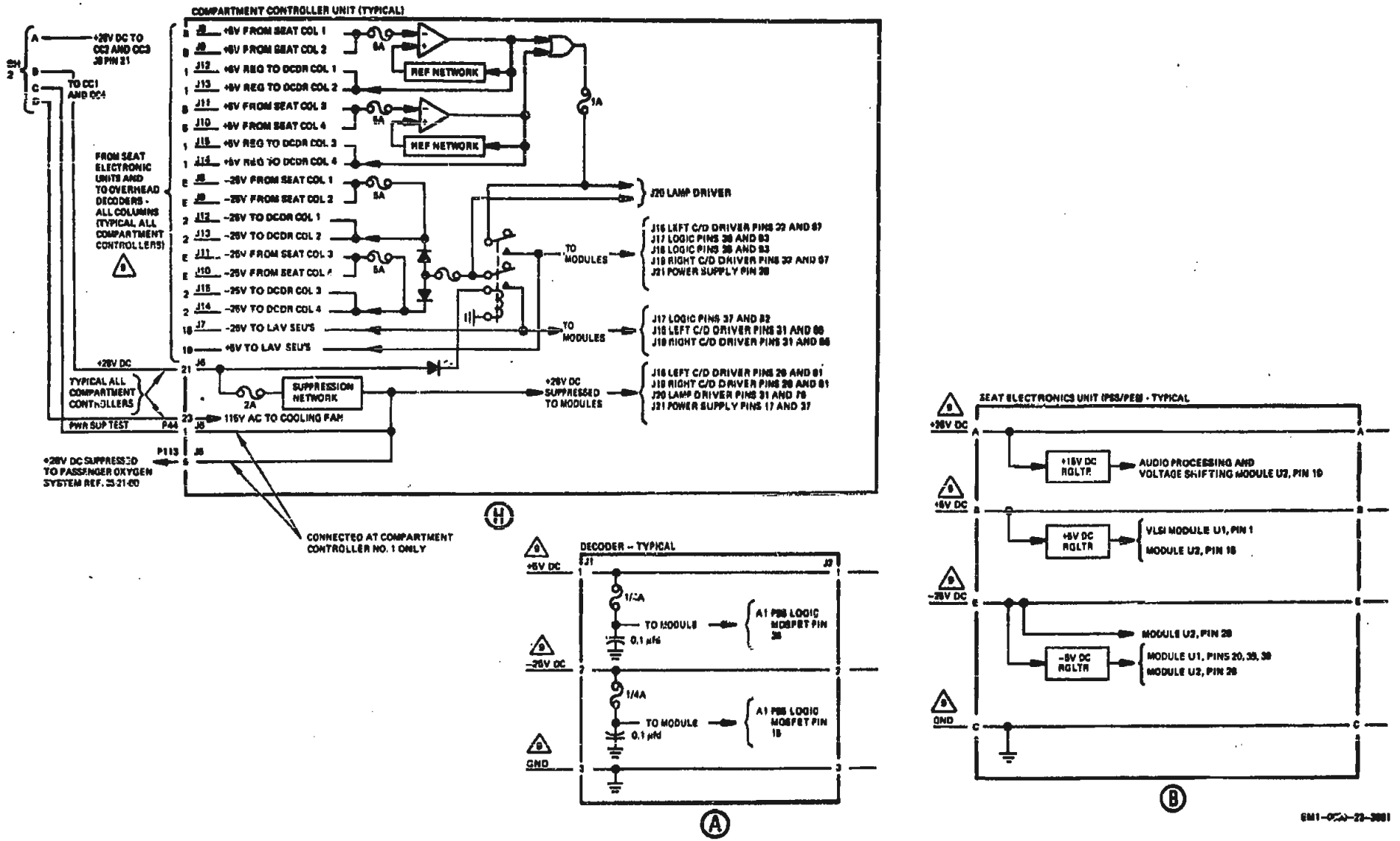


PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 3)



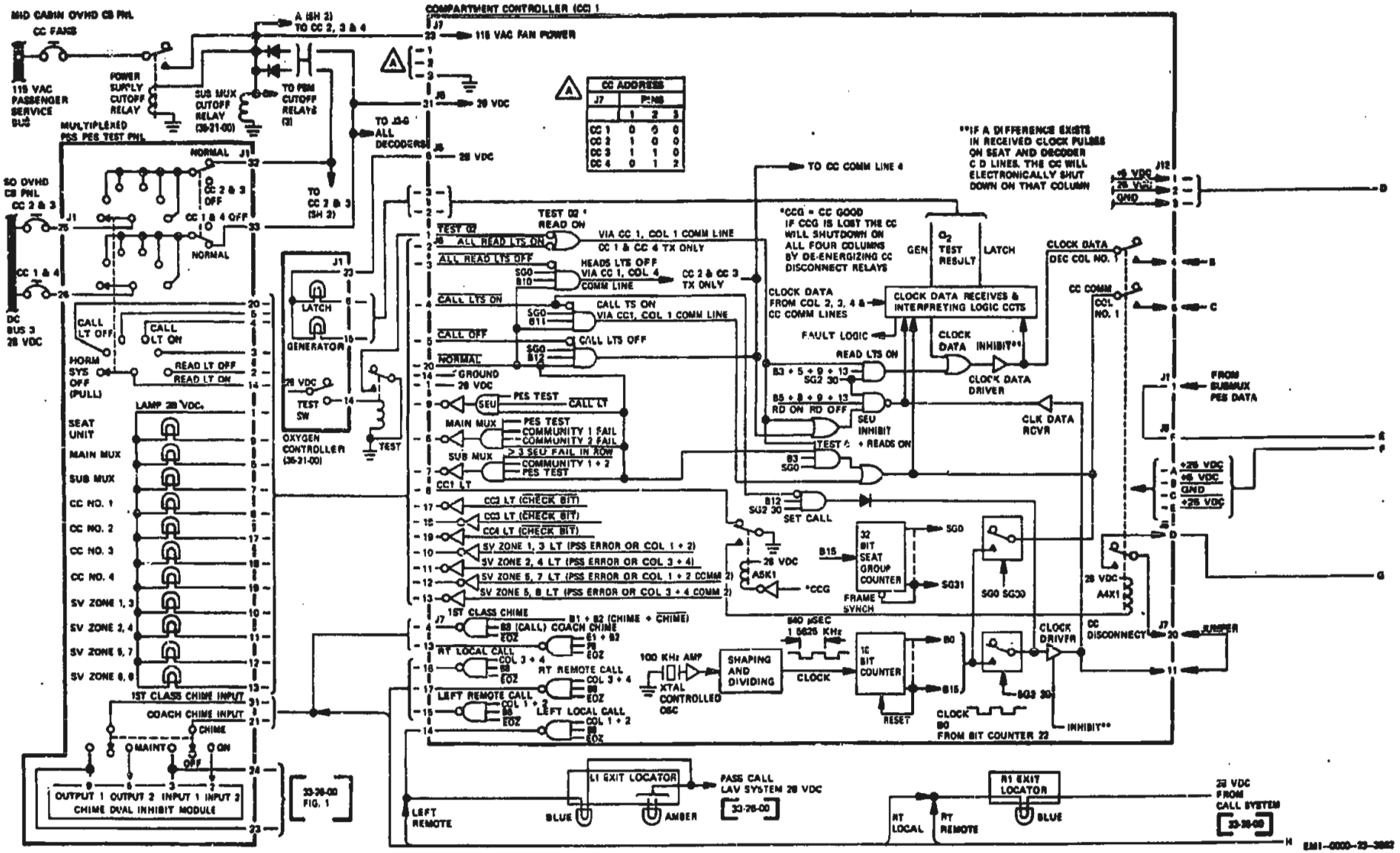
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 4)

R EFFECTIVITY: 032-999
R
005B


COMPARTMENT CONTROLLER UNIT (TYPICAL)
+28V DC TO CC2 AND CC3 J8 PIN 21
TO CC1 AND CC4
FROM SEAT ELECTRONIC UNITS AND TO OVERHEAD DECODERS - ALL COLUMNS (TYPICAL ALL COMPARTMENT CONTROLLERS)
+8V FROM SEAT COL 1
+8V FROM SEAT COL 2
+8V REG TO DCDR COL 1
+8V REG TO DCDR COL 2
+8V FROM SEAT COL 3
+8V FROM SEAT COL 4
+8V REG TO DCDR COL 3
+8V REG TO DCDR COL 4
-28V FROM SEAT COL 1
-28V FROM SEAT COL 2
-28V TO DCDR COL 1
-28V TO DCDR COL 2
-28V FROM SEAT COL 3
-28V FROM SEAT COL 4
-28V TO DCDR COL 3
-28V TO DCDR COL 4
-28V TO LAV SEU'S
+8V TO LAV SEU'S
REF NETWORK
REF NETWORK
5A
5A
5A
5A
9A
J20 LAMP DRIVER
TO MODULES
J16 LEFT C/D DRIVER PINS 32 AND 67
J17 LOGIC PINS 36 AND 83
J18 LOGIC PINS 36 AND 83
J19 RIGHT C/D DRIVER PINS 32 AND 67
J21 POWER SUPPLY PIN 28
TO MODULES
J17 LOGIC PINS 37 AND 82
J18 LEFT C/D DRIVER PINS 31 AND 66
J19 RIGHT C/D DRIVER PINS 31 AND 66
+28V DC
TYPICAL ALL COMPARTMENT CONTROLLERS
SUPPRESSION NETWORK
2A
+28V DC SUPPRESSED TO MODULES
J16 LEFT C/D DRIVER PINS 29 AND 61
J19 RIGHT C/D DRIVER PINS 29 AND 61
J20 LAMP DRIVER PINS 31 AND 76
J21 POWER SUPPLY PINS 17 AND 37
PWR SUP TEST P44
115V AC TO COOLING FAN
P113
+28V DC SUPPRESSED TO PASSENGER OXYGEN SYSTEM REF. 35-21-00
CONNECTED AT COMPARTMENT CONTROLLER NO. 1 ONLY
H
DECODER -- TYPICAL
+5V DC
-28V DC
GND
1/2A
1/4A
0.1 µfd
TO MODULE
A1 PSS LOGIC MOSFET PIN 36
A1 PSS LOGIC MOSFET PIN 15
A
SEAT ELECTRONICS UNIT (PSS/PES) - TYPICAL
+28V DC
+5V DC
-28V DC
GND
+15V DC RGLTR
AUDIO PROCESSING AND VOLTAGE SHIFTING MODULE U2, PIN 19
+5V DC RGLTR
VLSI MODULE U1, PIN 1
MODULE U2, PIN 18
MODULE U2, PIN 28
-5V DC RGLTR
MODULE U1, PINS 20, 35, 39
MODULE U2, PIN 28
B

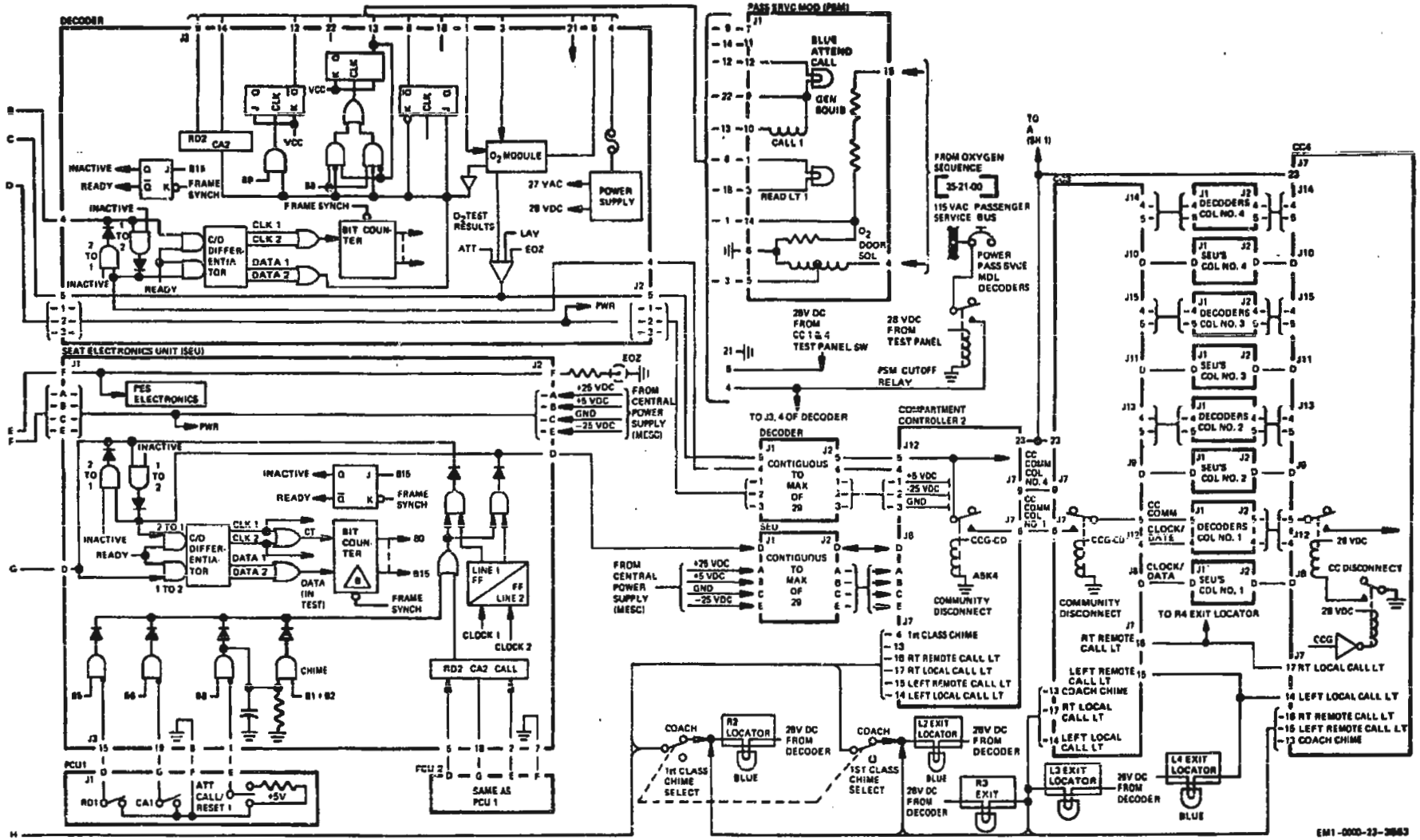
PSS/PES Power Distribution Schematic
SCHEM 1 (Sheet 5)

R EFFECTIVITY: 032-999
R
005B



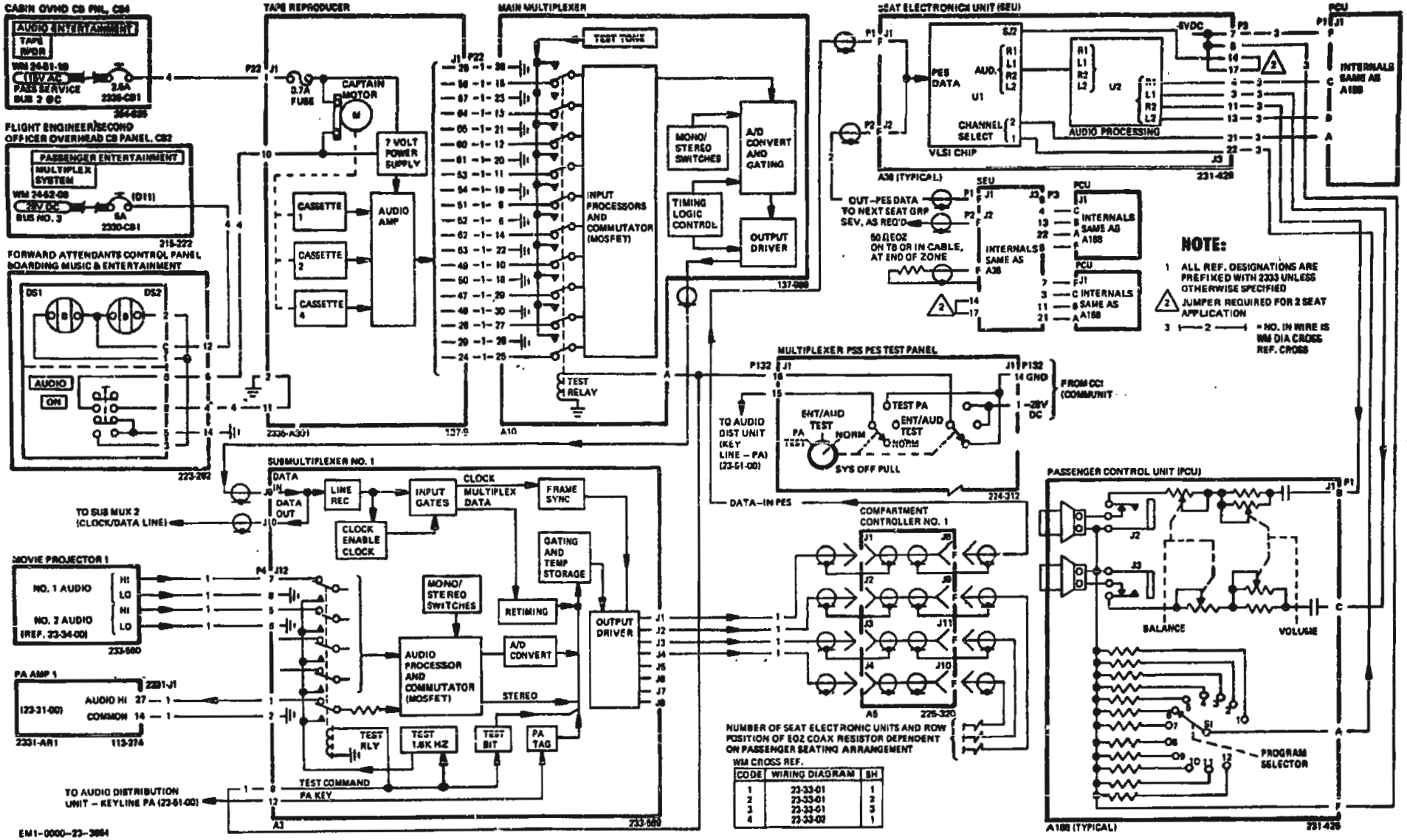
PSS Functional Schematic
SCHEM 2 (Sheet 1)

R
R
005B EFFECTIVITY: 032-999



PSS Functional Schematic
SCHEM 2 (Sheet 2)

R EFFECTIVITY: 032-999
R
0058



PES Functional Schematic
SCHEM 3

R PASSENGER SERVICE AND AUDIO ENTERTAINMENT (PSS/PES) SYSTEMS R ADJUSTMENT AND TEST

R 1. General

R The PSS/PES adjustment and test procedures include; (A) Central R Power Supply Recycle, (B) System Power Reset, (C) PSS/PES R Functional Test, (D) PSS System Operational Test and (E) PES R System Operational Test. When desired test results are not R obtained, refer to FAULT ISOLATION section of the manual. The R central power supply recycle procedure is used to reset power R supply protection circuits when they have switched off due to R aircraft buses voltage transients. This condition is indicated R when MULTIPLEXER PSS/PES TEST panel COMPARTMENT CONTROLLER 1 R light is on, and POWER SUPPLY light does not come on with the R TEST switch in either A or B.

R The system power reset procedure is used to reset disconnect R circuits in compartment controllers (CC) when they have R disconnected the CC due to voltage transients, or due to R connecting system power in the wrong sequence. This condition R is indicated by one of the test panel COMPARTMENT CONTROLLER R lights on.

R The PSS/PES functional test procedure provides a quick check of R PSS/PES status by using test switches and lights on the R MULTIPLEXER PSS/PES TEST panel. The PSS system is used to test R both the PES and the passenger oxygen system, therefore, the PSS R system must be operating properly before attempting to test the R PES or passenger oxygen system.

R The PSS test procedure provides a complete operational test of R passenger service system control unit functions.

R The PES system test procedure provides a complete operational R test of entertainment (audio) system functions, including R interface functions with the passenger address (PA), visual R entertainment, and boarding music systems.

R 2. Referenced Procedures

R 21-00-00 Air Conditioning System - Maintenance Practices

R 21-23-01 Individual Air Outlet - Adjustment and Test

R 21-25-00 Electronic and Electrical Service Centers Exhaust R Air Systems - Adjustment and Test

R 23-31-00 Passenger Address System - Adjustment and Test

23-34-00	Passenger Visual Entertainment System - Adjustment and Test
23-35-00	Boarding Music System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

3. Adjustment/Test

A. Recycle Central Power Supply

(1) If the TEST panel POWER SUPPLY light does not come on with the TEST switch in A or B position (or the power supply front panel TEST OK light does not come on with the UNIT TEST switch in A or B position), recycle power supply as follows:

B. Reset System Power

(1) If one of the test panel COMPARTMENT CONTROLLER fault lights is on, reset system power as follows:

R NOTE: Compartment controllers with serial numbers 213-up, and serial numbers 1-212 with modification label disc No. 1 punched out (incorporation of Telephonics Service Bulletin 275D498-1) should reset automatically; system power reset procedure should not be necessary for these compartment controllers.

(a) On MULTIPLEXER PSS/PES TEST panel, turn PSS selector switch to SYS OFF (PULL) position.

(b) On galley left circuit breaker panel, open all POWER-SVCE MDL circuit breakers, wait approximately 15-seconds, and then close all POWER-SVCE MDL circuit breakers and return test panel PSS selector switch to NORM.

C. PSS/PES Functional Test

(1) Turn on electrical power (Ref. 24-00-00).

Verify exhaust air flow at mid electrical service center (MESC) exhaust air outlet on bottom of left wing leading edge fillet (feel for air flow with hand - Ref. 21-25-00).

(2) Turn on PA system (Ref. 23-31-00).

(3) On galley left circuit breaker panel, zone 131, verify that circuit breakers AUDIO ENTERTAINMENT - TAPE RPDR (E8), SUB MULTIPLEXER - FWD, MID-AFT, and AFT (E10-E12); and POWER - PASS. SVCE MDL - 1, 2, 3, 4, 5, 6, 7, and 8 (F2-F9) are closed.

On galley right circuit breaker panel, zone 131, verify that POWER SUPPLY MULTIPLEXED PASS. SERVICE (E4) and COMPT CONT FANS (F5) circuit breakers are closed.

(4) In MESC, left equipment rack, zone 137, verify the following:

Central power supply POWER - CB1 switch is in NORMAL

Operator test tape cassettes or music tape cassettes with easily identifiable tracks are installed

Main multiplexer STEREO SWITCHES are in correct positions

(5) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel, CB2, zone 215, verify that circuit breaker HOST ADVSY IND (C8),

(6) On MULTIPLEXER PSS/PES TEST panel, zone 224, verify that PSS selector switch is in NORM.

(7) Depress LAMP TEST switch, and verify that all test panel lights come on.

(8) Position POWER SUPPLY TEST switch first to A, and then to B.

At each position, verify that POWER SUPPLY light comes on.

NOTE: When POWER SUPPLY TEST switch is moved to, or released from, position B, the test panel fail lights may come on momentarily.

(9) With PSS and PES selector switches in NORM, verify that no COMPARTMENT CONTROLLER or SERVICE ZONE fault lights are on.

(10) Turn PSS selector switch to READ LT - ON.

R Verify that all passenger reading lights are on, and
R LAV and attendants O_2 test lights are on (blue).

NOTE: Passenger service modules above some no-seat rows (coffee bars, lounges, unused seat rows,

etc.) are not connected. Passenger reading and attendant call lights on these modules can not be turned on, and individual air outlet valves can not be electrically opened or closed.

(11) Turn PSS selector switch to READ LT - OFF.

R Verify that all passenger reading lights are off, and
R LAV and attendants O_2 test lights are off (blue).

(12) Turn PSS selector switch to CALL/RESET (OFF) position, then to CALL LT - ON position, and verify that:

All blue attendant call lights above passenger seats come on

On aircraft 001-031,
all amber attendant call lights in lavatories and in ceiling by each lavatory door come on

All blue attendant advisory lights on bottom of EXIT signs, come on.

On aircraft 001-031,
amber attendant advisory lights, on bottom of EXIT signs by each passenger door come on. HI chime sounds on PA system chime speakers.

NOTE: Test panel CHIME switch must be ON for hi-chime to operate.

(13) Turn PSS selector switch to CALL/RESET (OFF) position, and verify that:

All blue attendant call lights above passenger seats go off

On aircraft 001-031,
all amber attendant call lights in lavatories and in ceiling by lavatory doors go off. All blue attendant advisory lights, on bottom of EXIT signs, go off.

On aircraft 001-031,
All amber attendant advisory lights, on bottoms of EXIT signs, go off.

NOTE: On aircraft 032-999,
the lavatory attendant call and advisory lights (amber) are controlled by the Lavatory Call System (Ref. 33-26-00).

(14) Return PSS selector switch to NORM, and verify that:

No reading lights or attendant call lights are flashing

No blue or amber attendant call lights come on (unless CALL button is pulled)

(15) On left forward cabin attendants control panel BOARDING MUSIC & ENTERTAINMENT panel, depress AUDIO - ON switchlight, select CHANNEL - 1, 2, 3, or 4, and adjust VOLUME for comfortable listening level.

WARNING: DO NOT SWITCH PASSENGER ENTERTAINMENT SYSTEM (PES) TO ENTERTAIN/AUD TEST OR PA TEST MODE WHILE ANY PERSONNEL OR PASSENGERS ARE WEARING HEADPHONES, AS TEST TONE SOUND LEVEL IS HIGH ENOUGH TO CAUSE HEARING DAMAGE.

(16) On test panel, turn entertainment system (PES) selector switch to ENTERTAIN/AUD TEST, and verify that:

All blue attendant call lights above passenger seats come on.

Using pneumatic headphones, check for test tone at one passenger seat in each entertainment zone.

The SERVICE ZONE, MULTIPLEXER (MAIN or SUB), or SEAT UNIT fault lights DO NOT come on.

(17) Turn PES selector switch to PA TEST, and verify that:

The SERVICE ZONE, MULTIPLEXER - MAIN, and SEAT UNIT fault lights come on (MULTIPLEXER - SUB light not on).

All blue attendant call lights go off.

(18) Turn PES selector switch to NORM, and verify that tape reproducer audio is available at passenger seat in each service zone (Ref. Table 502).

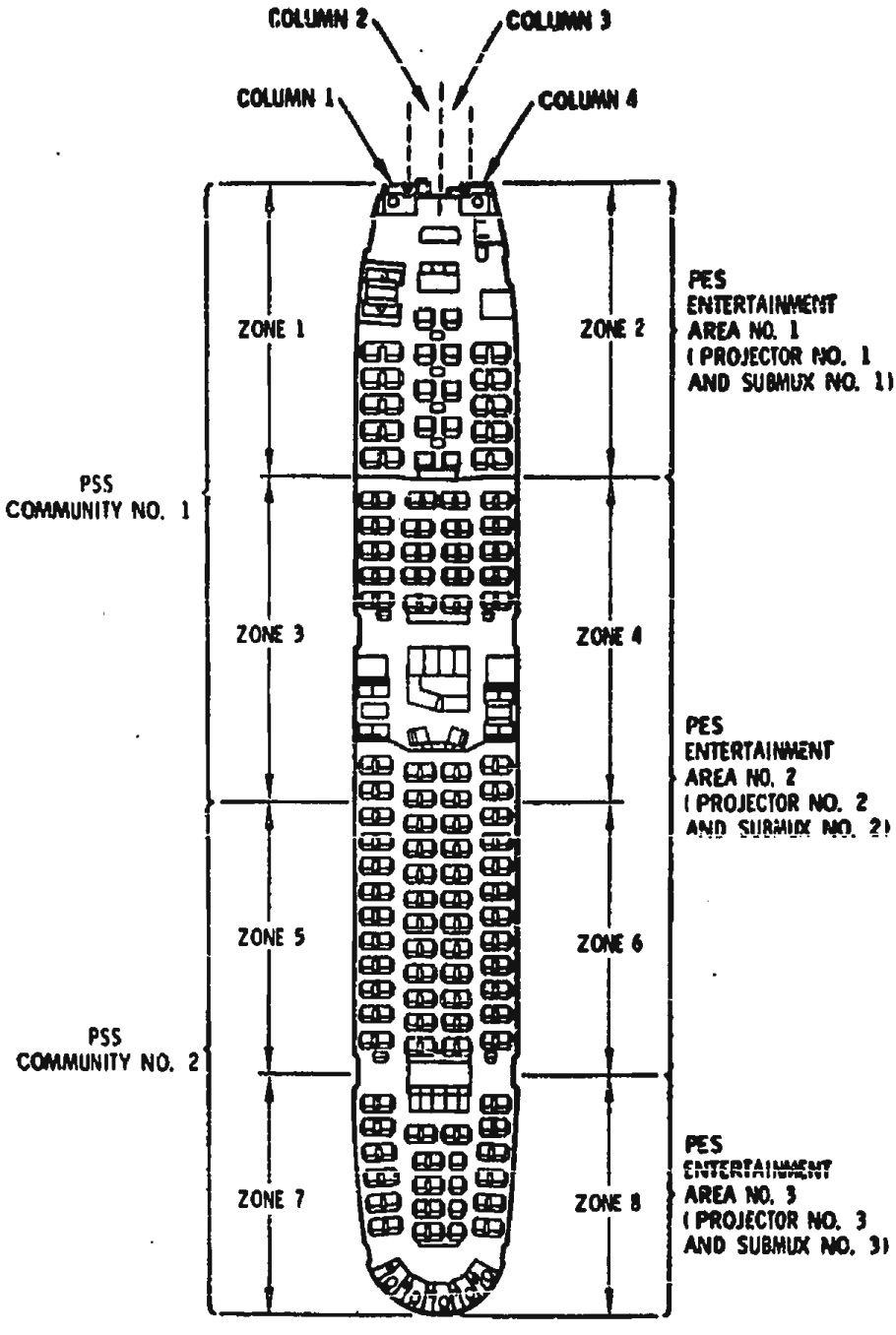
(19) If test tape cassettes were installed in tape reproducer, replace them with entertainment tape cassettes as necessary.

(20) Turn off tape reproducer (release AUDIO - ON switchlight), and electrical power (Ref. 24-00-00).

(21) Verify that test panel PSS and PES switches are in NORM position.

D. Passenger Service System (PSS) Operational Test

(1) Turn on electrical power (Ref. 24-00-00).



M1-5000-23-941

R PSS/PES Community/Zone/Column/Area Boundaries
R Figure 501

EFFECTIVITY: ALL

002B

(2) Verify exhaust air flow at MESC exhaust air outlet on bottom of left wing leading edge fillet, feel for air flow with hand (Ref. 21-25-00).

(3) Verify that PA system is on (Ref. 23-31-00), and MULTIPLEXER PSS/PES TEST panel PSS selector switch is in NORM.

(4) On galley left circuit breaker panel, zone 131, verify that circuit breakers AUDIO ENTERTAINMENT - SUB MULTIPLEXER - FWD, MID-AFT and AFT (E10-E12); and POWER - PASS. SVCE MDL - 1, 2, 3, 4, 5, 6, 7, and 8 (F2-F9) are closed.

R (5) On galley right circuit breaker panel, zone 131, verify that circuit breakers POWER SUPPLY MULTIPLEXED PASS. SERVICE (E4) and COMPT CONT FANS (F5) are closed.

(6) In MESC, left equipment rack top shelf, zone 137, verify that central power supply POWER - CB1 switch is in NORMAL.

(7) On power supply, select UNIT TEST switch first to A, and then to B, and verify that TEST OK light comes on at both positions.

(8) On FE/SO overhead circuit breaker panel, CB2, zone 215, verify that the following circuit breakers are closed:

HOST ADVSY IND (C8)

On aircraft 001-017 without SB23-030, MULTIPLEX SYSTEM (D11)

On aircraft 001-017 with SB23-030 and 018-999, MULTIPLEX SYS - CC2, 3 (D10) and CC1, 4 (D11).

(9) On MULTIPLEXER PSS/PES TEST panel, zone 224, depress LAMP TEST switch, and verify that all test panel lights come on.

(10) Select POWER SUPPLY TEST switch first to A, then to B.

At each position, verify that POWER SUPPLY light comes on.

NOTE: When POWER SUPPLY TEST switch is moved to, or released from, positions A or B, the test panel fail lights may come on momentarily.

(11) With PSS/PES selector switches in NORM, verify that no COMPARTMENT CONTROLLER or SERVICE ZONE lights are on.

(12) Turn PSS selector switch to READ LT - ON.

R R Verify that all passenger reading lights are on and LAV and attendants O_2 test lights (blue) are on.

NOTE: Passenger service modules above some no-seat rows (coffee bars, lounges, unused seat rows, etc.) are not connected. Passenger reading and attandant call lights on these modules cannot be turned on, and individual air outlet valves cannot be electrically opened or closed.

Passenger service modules above certain no-seat rows are not connected (two above carry-on luggage module by R1 door, one each above carry-on luggage modules by L2 and R2 doors; in addition, with coach lounge installed, one in each inboard column between bar and single angled seats).

Passenger reading lights which were on before test was started will remain on after test is completed. If unsure of test results, return PSS selector switch to NORM, turn reading light(s) off at seat arm, and repeat test.

(13) Turn PSS selector switch to READ LT - OFF.

R R Verify that all passenger reading lights are off LAV and attendants O_2 test lights (blue) are off.

(14) Turn PSS selector switch to CALL/RESET (OFF) position, then to CALL LT ON position, and verify that:

All blue attendant call lights above passenger seats come on.

On aircraft 001-031,
all amber attendant call lights in lavatories and in ceiling by each lavatory door come on.

All blue attendant call lights come on. On aircraft 001-031,
amber attendant advisory lights, on bottom of EXIT signs by each passenger door, come on.

HI chime sounds on PA chime speakers

NOTE: On aircraft 032-999,
the lavatory attendant call and advisory lights are controlled by the Lavatory Call System (Ref. 33-26-00).

NOTE: Test panel CHIME switch must be ON for chime speakers to operate.

(15) Turn PSS selector switch to CALL/RESET (OFF) position, and verify that:

All blue attendant call lights above passenger seats go off.

On aircraft 001-031,
all amber lav attendant call lights and ceiling lights above lav door go off.

All blue and amber attendant advisory lights (on bottom of EXIT signs) go off.

(16) Turn PSS selector switch to NORM, and verify that:

No passenger reading lights or attendant call lights are flashing.

(17) Perform following tests at each passenger seat control unit:

(a) Activate READ LIGHT switch, and verify that correct reading light comes on over seat.

(b) Deactivate READ LIGHT switch, and verify reading light goes off.

(c) Activate ATTENDANT CALL switch, and verify that proper call and advisory light (under EXIT locator) comes on, and hi-chime sounds.

(d) Deactivate ATTENDANT CALL switch, and verify call and advisory lights go out and no hi-chime sounds.

(e) Depress cool-air control switch, and listen for sound of air valve actuation.

Lavatory attendant call lights can be reset from forward left or aft left attendants panel LAV RESET switchlight, as applicable. Attendant call chime sounds in first class or coach area only, as applicable.

NOTE: On aircraft 001-031,
PA DISTRIBUTION - 1ST CLASS DIVIDER LOCATION switch above ceiling by submux 2 (zone 253) must be in NORMAL position for correct first class/coach chime distribution.

(18) Pull ATTENDANT CALL switch in one aft lavatory, and verify that:

Lav ATTENDANT CALL light comes on.

ATTENDANT CALL light in ceiling outside lav comes on.

Amber attendant advisory light under EXIT sign comes on.

Hi-Chime sounds in cabin.

NOTE: On aircraft 032-999, the lavatory attendant call and advisory (EXIT) lights are controlled by the Lavatory Call System, refer to 33-26-00 for test data.

(19) Depress ATTENDANT CALL switch, and verify that:

Lav, ceiling and advisory lights go out, and no hi-chime sounds.

(20) Repeat Steps (18) and (19) for remainder of aft lavatories.

(21) Pull ATTENDANT CALL switch in each aft lavatory to illuminate all aft call lights and amber attendant advisory lights, then depress MASTER LAVATORY RESET switch (left aft attendart station) and verify that all aft call and amber advisory lights go out.

(22) Pull ATTENDANT CALL switch in one forward lavatories, and verify that:

Lav ATTENDANT CALL light comes on.

ATTENDANT CALL light in ceiling outside lav comes on.

Amber attendant advisory light under EXIT sign comes on.

Hi-Chime sounds in cabin.

(23) Depress ATTENDANT CALL switch, and verify that:

Lav, ceiling and advisory lights go out, and no hi-chime sounds.

(24) Repeat Steps (22) and (23) for remainder of lavatories.

(25) Pull ATTENDANT CALL switch in each forward lavatory to illuminate all forward call lights and amber attendant

advisory lights, then depress MASTER LAVATORY RESET switch (left forward attendant station), and verify that all forward call and amber advisory lights go out.

R (26) On aircraft 032-999, perform following checks:

(a) On MULTIPLEXER PSS/PES TEST panel, position CC selector switch to 1 & 4, and verify that COMPARTMENT CONTROLLER 2 and 3 fault lights come on.

(b) Place an ATTENDANT CALL from one passenger seat in each column of each service zone, and verify that proper call and attendant advisory lights come on, and hi-chime sounds.

R (c) Position CC selector switch to 2 & 3.

(d) Place an attendant call from one passenger seat in each column of each service zone, and verify that proper call and attendant advisory lights come on, and hi-chime sounds.

(e) Position CC selector switch to NORM, and verify that test panel fault lights are out.

(27) If passenger autio entertainment system (PES) operational test is to be performed, leave all systems in operation which were turned on in Steps 3D(1) and (3).

(28) If passenger audio entertainment system operational test is not to be performed, turn off electrical power (Ref. 24-00-00).

E. Passenger Audio Entertainment System (PES) Operational Test

WARNING: DO NOT SWITCH PASSENGER ENTERTAINMENT SYSTEM TO ENTERTAINMENT/AUD TEST OR PA TEST MODE WHILE ANY PERSONNEL OR PASSENGERS ARE WEARING HEADSETS. SOUND LEVEL OF TEST TONE IS HIGH ENOUGH TO CAUSE HEARING DAMAGE.

NOTE: Passenger audio entertainment system (PES) operational test is dependent upon a properly operating passenger service system (PSS). Do not attempt PES test until PSS is verified to be operating properly.

(1) Before starting PES test, ensure all blue call lights are off, and PSS selector switch is in NORM position.

(2) In addition to turning on supporting systems and closing circuit breakers as in Steps 3D(1), (3), (4), (5), and (7):

R On galley left circuit breaker panel, zone 131, verify circuit breaker(s) AUDIO ENTERTAINMENT - TAPE RPDR (E8) is closed.

(3) In mid electrical service center (MESC) at left equipment rack, verify that test tape cassettes (or music tape cassettes with easily identifiable tracks) are installed.

(4) On left forward cabin attendants control panel BOARDING MUSIC & ENTERTAINMENT panel, depress AUDIO - ON switchlight, select CHANNEL - 1, 2, 3, or 4, and adjust VOLUME control for comfortable listening level.

(5) With boarding music (BM) playing over the passenger address (PA) speakers, connect pneumatic headphones to one passenger seat control unit in each service zone, and listen to multiplex audio while someone speaks into PA mics, as listed. Verify results obtained as indicated on Figure 502.

WARNING: DO NOT SWITCH PASSENGER ENTERTAINMENT SYSTEM (PES) TO ENTERTAIN/AUD TEST OR PA TEST MODES WHILE ANY PERSONNEL OR PASSENGERS ARE WEARING HEADPHONES, AS SOUND LEVEL OF TEST MODES ARE HIGH ENOUGH TO CAUSE HEARING DAMAGE.

(6) On MULTIPLEXER PSS/PES TEST panel, turn PES selector switch to ENTERTAIN/AUD TEST, and verify that:

PA STA	MUX AUDIO AREAS/ZONES				PA SPEAKERS	
	1 & 2	3 & 4	5 & 6	7 & 8	1ST CL	COACH
FLT STA (SELECT) 1ST CL COACH ALL	PA MUX PA	MUX PA PA	MUX PA PA	MUX PA PA	PA BM PA	BM PA PA
1ST CLASS 1ST CL ALL	PA PA	MUX PA	MUX PA	MUX PA	PA PA	BM PA
AFT COACH COACH ALL	MUX PA	PA PA	PA PA	PA PA	BM PA	PA PA
UPPER GALLEY 1ST CL COACH ALL	PA MUX PA	MUX PA PA	MUX PA PA	MUX PA PA	PA BM PA	BM PA PA

1 ON AIRCRAFT 032-999, WHEN A R1, R2, R3, R4, L2 OR L3 DOOR POSITION MICROPHONE IS KEYED, PA OVERRIDE RESULTS ARE THE SAME AS FOR THE UPPER GALLEY ALL SELECTION. THESE RESULTS DO NOT DEPEND ON 1ST CLASS OR COACH SWITCHLIGHT POSITION.

M1-0000-23-3651

R
R

PA Override Function Test Data
Figure 502

EFFECTIVITY: ALL

002B

All blue attendant call lights above passenger seats come on

No test panel SERVICE ZONE, MULTIPLEXER (MAIN or SUB), or SEAT UNIT fault lights come on

(7) Turn PES switch to PA TEST, and verify that:

All blue attendant call lights above passenger seats go off

All four test panel SERVICE ZONE, MULTIPLEXER - MAIN, and SEAT UNIT lights come on (MULTIPLEXER - SUB light not on).

(8) Turn PES selector switch to NORM, and perform the following at each passenger seat control unit.

Using pneumatic headphone, check for proper audio channel program select and volumn control functions, refer to Table 501. If passenger visual entertainment system is turned on (Ref. 23-34-00), verify movie audio is available on correct channels at all passenger seats.

If boarding music system is turned on (Ref. 23-35-00), boarding music may be available on one of the unused program channels (depending on main multiplexer STEREO SWITCHES positions).

(9) If movie audio is available, verify correct zone distribution of audio channels as follows (Ref. Table 501 and Figure 501):

Projector No. 1 audio to seats in zones 1 and 2

C Projector No. 2 audio to seats in zones 3, 4, 5, and 6
C and to zones 7 and 8 on channel 12

Projector No. 3 audio to seats in zones 7 and 8

(10) If passenger visual entertainment system was operated, rewind film and stow projector as necessary.

If test tape cassettes were installed in tape reproducer, replace them with entertainment tape cassettes as necessary.

(11) Turn off passenger visual entertainment system (Ref. 23-34-00), boarding music system(Ref. 23-35-00), and electrical power (Ref. 24-00-00).

(12) On MULTIPLEXER PSS/PES TEST panel, verify following switch positions:

PES and PSS selector switches in NORM.

CHIME switch in ON.

On aircraft 032-999,
CC selector switch to NORM.

Typical Audio Entertainment Programming
Table 501

	SEAT PCU CHAN	AUDIO FROM	MUX CHAN TIME	STEREO SWITCH	TYPE PRGM	TAPE RPDR TRK/MOVIE	TAPE CASS-ETTE
	1	SUBMUX	1	S/MUX S1	MONO	MOVIE CHANNEL 1	NONE
	2	SUBMUX	1	S/MUX S1	MONO	MOVIE CHANNEL 1	NONE
	3	M/MUX	5 & 6	M/MUX S5	STEREO	1 & 3	1
	4	M/MUX	7 & 8	M/MUX S7	STEREO	2 & 4	1
	5	M/MUX	9	M/MUX S9	MONO	5	2
	6	M/MUX	10	M/MUX S9	MONO	7	2
	7	M/MUX	11	M/MUX S11	MONO	6	2
	8	M/MUX	12	M/MUX S11	MONO	8	2
	9	M/MUX	13	M/MUX S13	MONO EXTEND PLAY	13/14	4
	10	M/MUX	14	M/MUX S13	MONO EXTEND PLAY	15/16	4
	11	SUBMUX	3	S/MUX S3	NONE	NONE (SPARE)	NONE
C	12	SUBMUX	4	S/MUX S3	*	*	NONE

C *No. 2 movie audio connected to No. 3 submux so passengers
C in aft coach zone can hear No. 2 movie on PCU channel.
C Channel 12 is blank in other zones.

MAIN MULTIPLEXER - REMOVAL AND INSTALLATION

R 1. Referenced Procedure

R 20-23-02 Rack Mounted ARINC Box Latch Lever - Maintenance
R Practices

R 2. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY MULTIPLEXED PASS SERVICE.

(2) On galley left circuit breaker panel, zone 131, open and tag circuit breaker AUDIO ENTERTAINMENT TAPE RPDR.

(3) In mid electrical service center, zone 137, locate main multiplexer on left equipment rack (Ref. Fig. 401).

(4) Release locking mechanism in camloc handle of main multiplexer and pull forward until connector disconnects, then remove multiplexer.

B. Installation

(1) Verify that circuit breakers opened in Steps A(1) and A(2) are open and tagged.

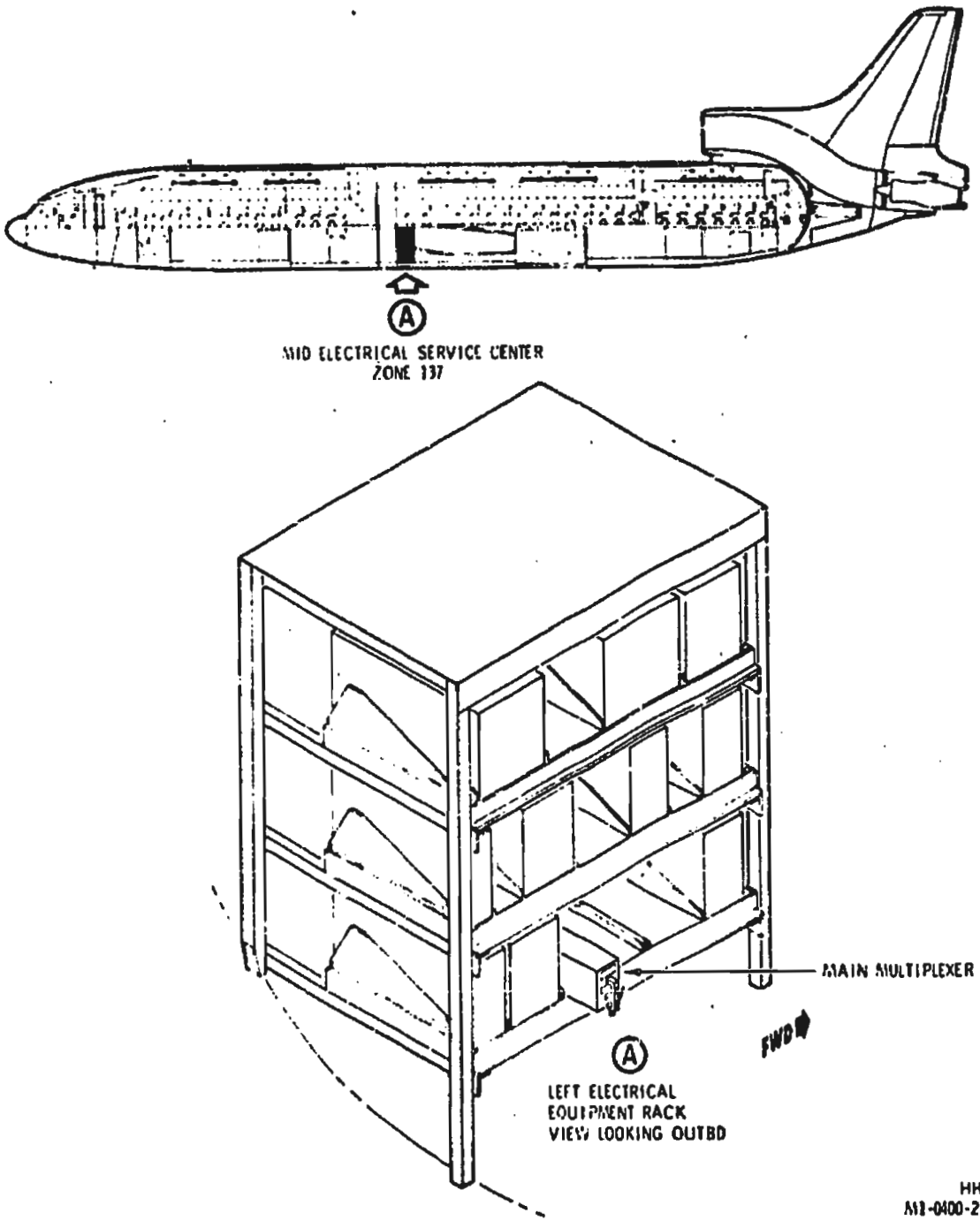
(2) In mid electrical service center, zone 137, position multiplexer at left equipment rack (Ref. Fig. 401).

CAUTION: IF MULTIPLEXER BINDS OR BECOMES DIFFICULT TO SLIDE, REMOVE MULTIPLEXER AND INSPECT CONNECTORS FOR BROKEN OR BENT PINS BEFORE PROCEEDING WITH INSTALLATION.

(3) Slide multiplexer into rack until connectors mate and multiplexer fits tightly against connector.

R (4) Assure latch lever mechanism has engaged rack mounting
R bracket and multiplexer is securely held in place (Ref.
R 20-23-02).

(5) Remove tags and close circuit breakers opened in Steps A(1) and A(2).



Main Multiplexer - Removal and Installation
Figure 401

SUBMULTIPLEXER - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-33-00 Passenger Audio Entertainment and Service System Fault Isolation

23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

24-00-00 Electrical Power - Maintenance Practices

25-26-01 Forward, Mid and Aft Ceiling Trim Drop Panels - Removal and Installation

2. Removal/Installation

A. Removal

R (1) On galley left circuit breaker panel, zone 131, open and tag circuit breaker AUDIO ENTERTAINMENT - SUBMULTIPLEXER - FWD, MID-AFT, or AFT (10E-12E).

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. BEFORE WORKING ON THE AFT SUBMUX, TAG INNER AND OUTER HANDLES AND SWITCHES OF L4 DOOR TO PREVENT DOOR OPERATION.

(2) Gain access to submultiplexer by opening passenger compartment ceiling drop panel (Ref. 25-26-01) 233DB (SUBMUX 1), 253JB (SUBMUX 2), or 273 GB (SUBMUX 3).

(3) Disconnect connectors on submultiplexer (Ref. Fig. 401).

(4) Remove mounting screws from base of submultiplexer and remove submultiplexer from rack.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. BEFORE WORKING ON THE AFT SUBMUX, TAG INNER AND OUTER HANDLES AND SWITCHES OF L4 DOOR TO PREVENT OPERATION.

(2) Place submultiplexer in rack and align base mounting holes with rack mounting holes (Ref. Fig. 401).

(3) Insert mounting screws and tighten firmly.

(4) Connect submultiplexer connectors and tighten firmly.

(5) Open STEREO SWITCHES panel on submultiplexer. Verify that S1 and S3 are in correct positions (Ref. 23-33-00, Adjustment and Test, Table 501).

(6) Remove tags and close circuit breakers opened in Step 2A(1).

(7) Turn on electrical power (Ref. 24-00-00).

(8) Turn on passenger audio entertainment and service system (Ref. 23-33-00, Adjustment and Test).

At MULTIPLEXER PSS/PES TEST (test) panel, switch service test selector to NORM, and entertainment test selector to ENTERTAIN TEST. Verify that test panel MULTIPLEXER - MAIN and SUB, and SEAT UNIT lights are not on.

(9) Locate zones serviced by submultiplexer which was replaced.

NOTE: Submultiplexer No. 1 services zones 1 and 2, submultiplexer No. 2 services zones 3,4,5, and 6, and submultiplexer No. 3 services zones 7 and 8 (Ref. 23-33-00, Fault Isolation, Fig. 101). Submultiplexer No. 2 (AFT) services zones 5, 6, 7, and 8.

At one seat in each column of zones serviced by submultiplexer which was replaced, verify that test tone audio is loud and clear on all entertainment channels.

(10) On test panel, switch entertainment test selector to PA TEST.

Verify that test panel MULTIPLEXER - MAIN and SEAT UNIT lights are on.

(11) At same seats as in (9), verify that test tone is present at reduced level on all entertainment channels.

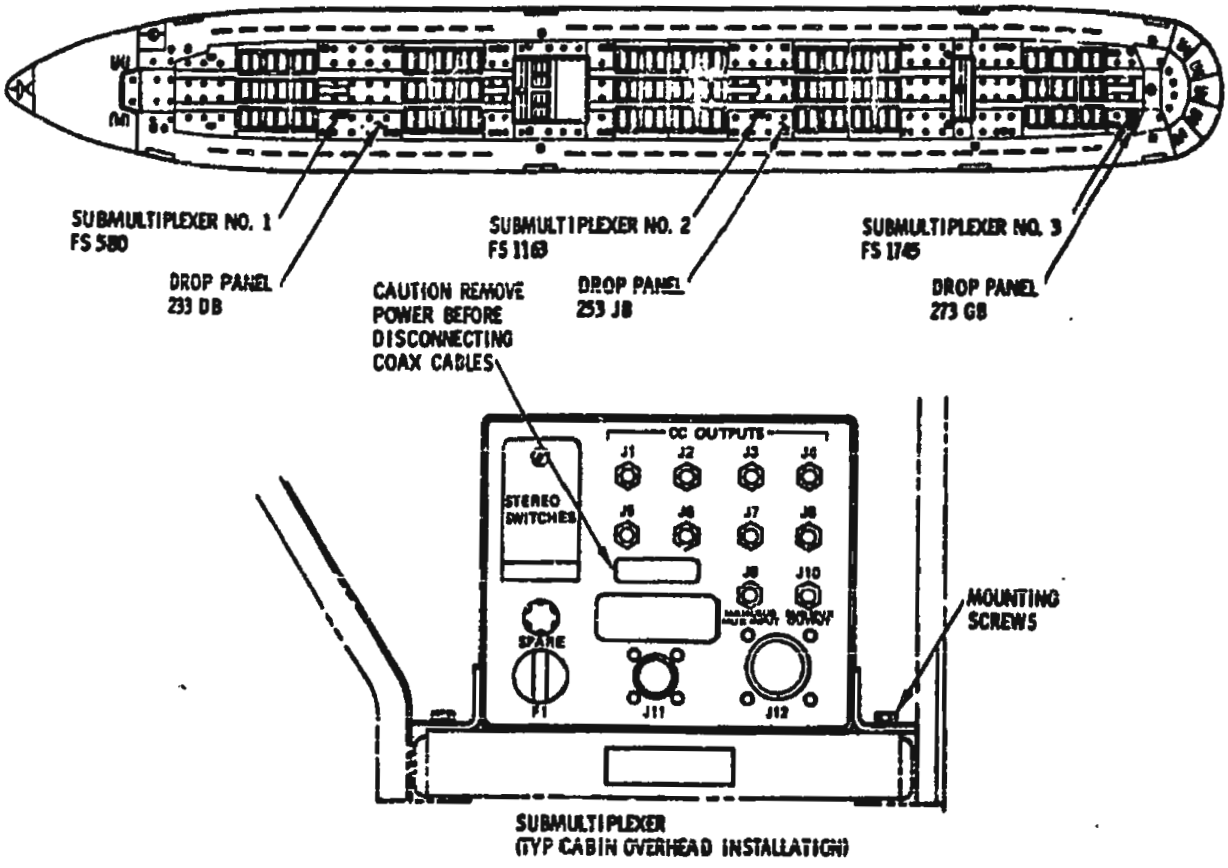
(12) Switch test panel entertainment test selector to NORM.

Turn off passenger audio entertainment and service system (Ref. 23-33-00, Adjustment and Test).

(13) Turn off electrical power (Ref. 24-00-00).

(14) Close ceiling drop panel (Ref. 25-26-01).

(15) If passenger door handles and switches were tagged to prevent operation, remove tags.



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R
R

Submultiplexer - Removal and Installation
Figure 401

EFFECTIVITY: ALL

002B

TWO-SEAT ELECTRONICS UNIT (PSS/PES)- REMOVAL AND INSTALLATION

1. Referenced Procedure

	23-33-00	Passenger Audio Entertainment and Service (PSS/PES) System - Adjustment and Test
C	23-33-04	Multiplex System Seat Electronic Unit Connectors -
C		Approved Repairs

2. Removal/Installation

A. First Class Seat - Removal (on aircraft with first class and coach seating)

(1) On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY - MULTIPLEXED PASS
R SERVICE (E4).

R (2) On MULTIPLEXER PSS/PES TEST panel, zone 224, turn PSS
R (service system) switch to SYS OFF (PULL) position.

(3) Locate seat electronics unit cover under seat (Ref. Fig. 401). Loosen two Phillips screws on rear seat leg, pull out plungers of three fasteners on front seat leg, and slide cover forward to remove.

(4) On seat electronics unit, depress metal release tabs on connectors J1 and J2 (forward connectors) and pull forward to disconnect. Remove four tri-wing fasteners from mounting flanges and pull unit forward to gain access to connector J3. Depress metal release tab on connector J3 and pull aft to disconnect. Remove seat electronics unit.

B. First Class Seat - Installation (on aircraft with first class and coach seating)

(1) Verify that circuit breaker opened in Step 2A(1) is
R opened and tagged and that service system switch on test panel is in SYS OFF (PULL) position.

WARNING: IF ANY SEAT-TO-UNDERFLOOR DISCONNECT CABLES FOR CENTER SEAT COLUMNS 2 OR 3 HAVE BEEN DISCONNECTED OR CONNECTED, VERIFY THAT UNUSED CABLES AND CABLE SLACK STORED UNDER PASSENGER COMPARTMENT FLOOR ARE SECURELY STOWED. LOOSE CABLES OR CABLE SLACK CAN BECOME ENTANGLED WITH FLIGHT CONTROL CABLES.

CAUTION: AIRCRAFT HAVE UNDERFLOOR STOWAGE TRAYS INSTALLED TO PROVENT INTERFERENCE OF SEAT-TO-UNDERFLOOR DISCONNECT CABLES WITH FLIGHT CONTROL CABLES. DO NOT ALLOW CABLE TO BEND SHARPLY AT CONNECTOR WHEN STOWED.

(2) Position seat electronics unit under seat with connector J3 facing aft. Align connector on seat cable with J3 and press firmly into place. Hold seat electronics unit against mounting brackets and install four tri-wing fasteners. Align connectors on seat-to-seat cables with connectors J1 and J2 and press firmly into place. Verify that seat-to-seat cables are correctly routed into plastic guideway, and that Velcro strap fasteners are secured around guideway (Ref. Fig. 401).

C C C C NOTE: Accomplish Engineering Repair 23-161 on the aircraft side connectors, if time permits and it has not already been accomplished (Ref. 23-33-04, Page 801 for details).

R (3) Close circuit breaker opened in Step 2A(1), and turn service system switch on test panel to NORM position.

(4) Perform passenger audio entertainment and service (PSS/PES) systems functional test (Ref. 23-33-00).

(5) Position seat electronics unit cover with two screw slots to rear. Slide cover under two Phillips screws on rear leg and align fasteners with holes on front leg. Depress fastener plungers on front leg, then tighten two Phillips screws on rear leg.

C. Coach Seat - Removal

R R R (1) Verify that circuit breaker opened in Step 2A(1) is opened and tagged and that service system switch on test panel is in SYS OFF (PULL) position.

(2) Locate seat electronics unit under seat of applicable seat group in mid or aft cabin or aft cabin (Ref. Fig. 402). Pull out plungers of two fasteners on front seat leg and two fasteners on rear seat leg. Remove cover.

(3) On seat electronics unit, remove four tri-wing fasteners from mounting flanges and pull unit out to gain access to connectors. Depress metal release tabs on connectors J1, J2, and J3 and pull connectors out. Remove seat electronics unit.

D. Coach Seat - Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged, and that service system switch on test panel is in SYS OFF (PULL) position.

WARNING: IF ANY SEAT-TO-UNDERFLOOR DISCONNECT CABLES FOR CENTER SEAT COLUMNS 2 OR 3 HAVE BEEN DISCONNECTED OR CONNECTED, VERIFY THAT UNUSED CABLES AND CABLE SLACK STORED UNDER PASSENGER COMPARTMENT FLOOR ARE SECURELY STOWED. LOOSE CABLES OR CABLE SLACK CAN BECOME ENTANGLED WITH FLIGHT CONTROL CABLES.

CAUTION: AIRCRAFT HAVE UNDERFLOOR STOWAGE TRAYS INSTALLED TO PREVENT INTERFERENCE OF SEAT-TO-UNDERFLOOR DISCONNECT CABLES WITH FLIGHT CONTROL CABLES. DO NOT ALLOW CABLE TO BEND SHARPLY AT CONNECTOR WHEN STOWED.

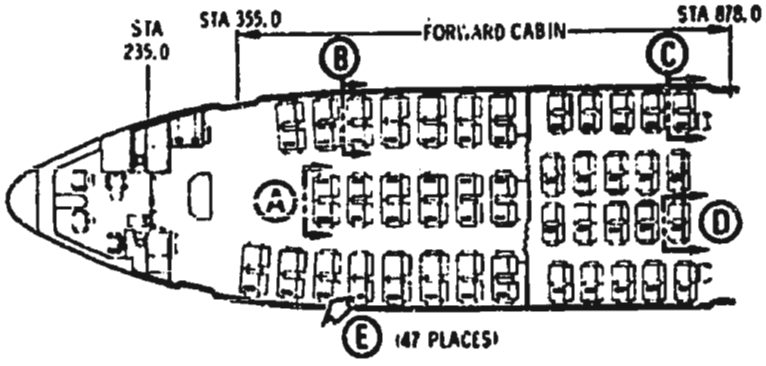
(2) Position seat electronics unit under seat with connector J3 facing aft. Align connector on seat cable with J3 and press firmly into place. Align connectors on seat-to-seat cables with J1 and J2 and press firmly into place. Verify that seat-to-seat cables are correctly routed into plastic guideway, and that Velcro strap fastener is secured around guideway.

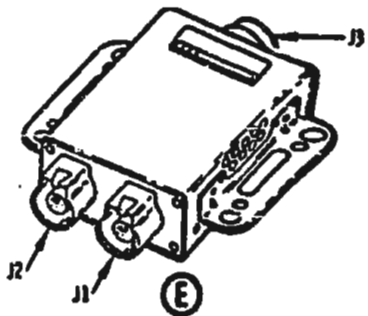
C NOTE: Accomplish Engineering Repair 23-161 on the
C aircraft side connectors if time permits, and it
C has not already been accomplished (Ref.
C 23-33-04, Page 801, for details).

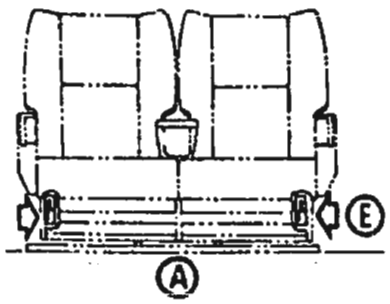
R (3) Close circuit breaker opened in Step 2A(1), and turn service system switch on test panel to NORM position.

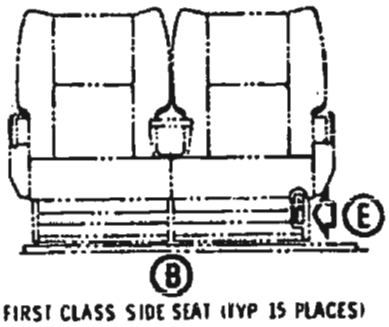
C (4) Perform BITE test of passenger audio entertainment and
C service (PSS/PES) system (Ref. 23-33-00).

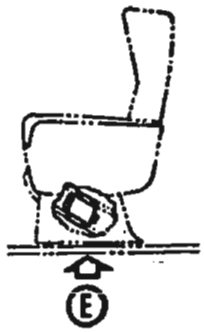
(5) Position seat electronics unit cover against seat legs and align fasteners with holes in seat legs. Depress fastener plungers to secure cover to seat legs.



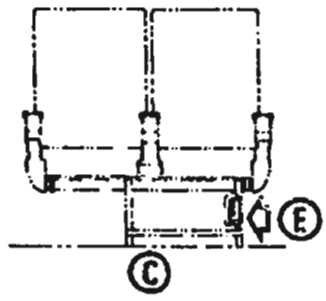


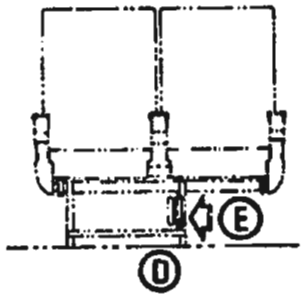






FORWARD CABIN SEAT GROUPS





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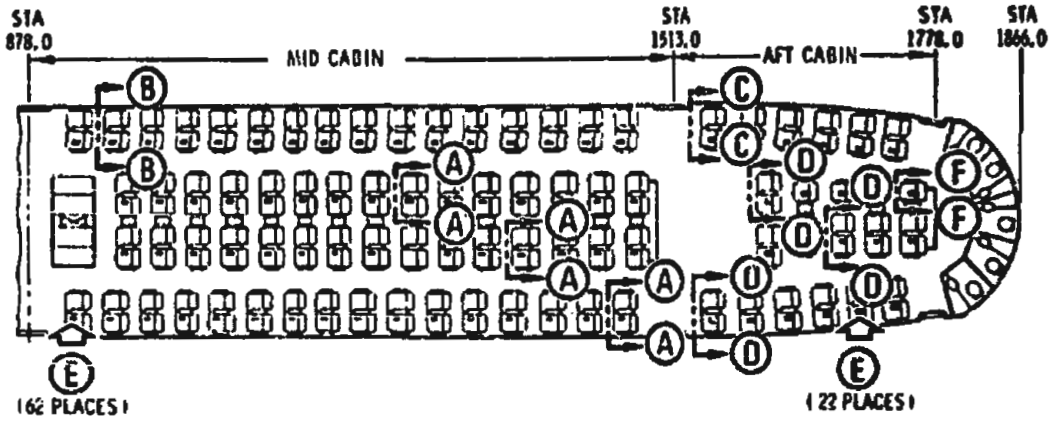
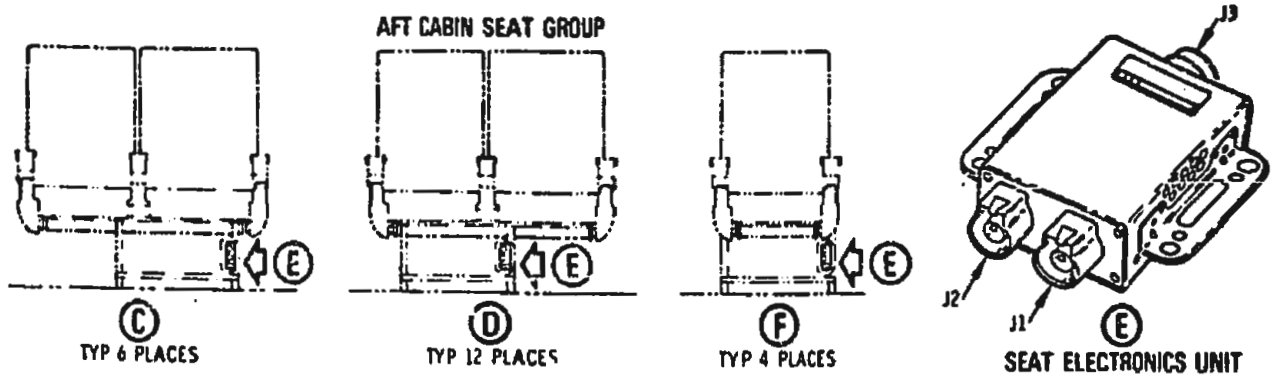
MI-5000-23-258

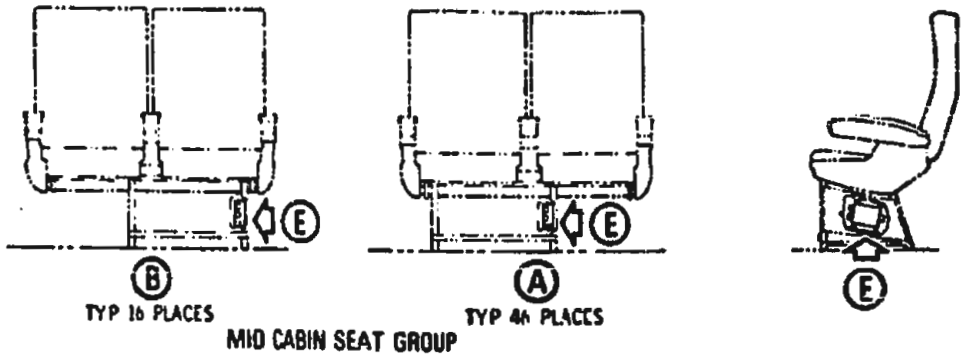
R Forward Cabin Two-Seat Electronics Unit (PSS/PES)
R Removal and Installation
R Figure 401

EFFECTIVITY: ALL

002B







HH 8606
M1-2000-23-259

R Mid and Aft Cabin Two-Seat Electronics Unit (PSS/PES)
R Removal and Installation
R Figure 402

EFFECTIVITY: ALL

002B

C MULTIPLEX SYSTEM SEAT ELECTRONIC UNIT CONNECTORS - APPROVED REPAIRS
C AND CONDITIONS

C 1. Repairs

C A. Any time multiplex system seat electronic unit connectors
C are disconnected for any reason, this repair may be
C performed to aid in preventing inadvertent release of
C connectors.

C 2. Approved Conditions

C A. Cables may be used with any or all of the following
C conditions.

C (1) The outer jacket of the cable may be frayed or scuffed
C provided there is no damage to the inner wires and the
C electrical continuity test is OK.

C (2) The plastic stops which normally limit the travel of
C the connector latch may be broken allowing the latch to
C rotate up to approximately 100 degrees provided the
C latch hinge is secure and the cable latches with tester
C normally.

C (3) Engineering Repair 23-161 (Ref. Fig. 801) may or may
C not be accomplished.

COMPARTMENT CONTROLLER - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

25-26-01 Forward, Mid and Aft Ceiling Trim Drop Panels - Removal and Installation

2. Removal/Installation

R A. Removal

R (1) On galley right circuit breaker panel, zone 131, open
R and tag circuit breakers POWER SUPPLY - MULTIPLEXED
R PASS SERVICE (E4), and COMPT - CONT FANS (F5).

R On galley left circuit breaker panel, zone 131, open
R and tag circuit breakers AUDIO ENTERTAINMENT -
R SUBMULTIPLEXER - FWD, MID AFT and AFT (E10 through
R E12).

On aircraft 001-017 without SB23-030, on Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker PASSENGER ENTERTAINMENT - MULTIPLEX SYSTEM (D11).

On aircraft 001-017 with SB23-030 and 018-999, on Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel, CB2, zone 215, open and tag circuit breakers MULTIPLEX SYS - CC 2, 3(D10) and CC 1, 4(D11).

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Open ceiling trim drop panel to gain access to compartment controller (Ref. 25-26-01).

NOTE: Compartment controller NO. 1 (CC1) is above panel 225CB, CC2 is above panel 243JB, CC3 is above panel 263EB, and CC4 is above panel 273GB.

(3) Disconnect all compartment controller connectors (Ref. Fig. 401).

(4) Remove mounting screws from base and remove compartment controller.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Place compartment controller in rack and align base mounting holes with rack mounting holes (Ref. Fig. 401).

(3) Insert mounting screws and tighten firmly.

(4) Connect compartment controller connectors and tighten firmly.

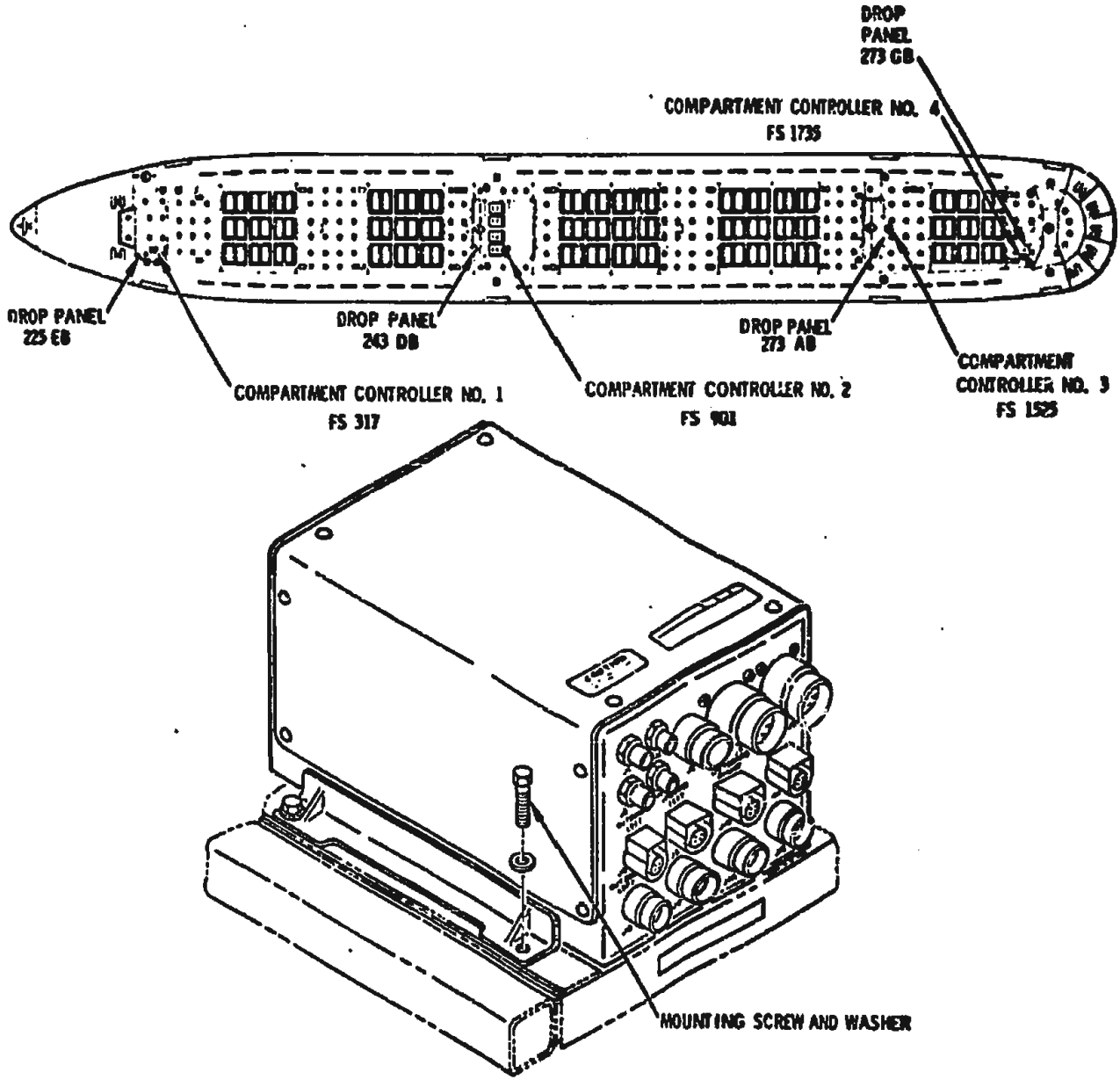
(5) Remove tags and close circuit breakers opened in Step 2A(1).

(6) Verify that fan on rear of compartment controller is running.

(7) Perform operational test of passenger audio entertainment and service system (Ref. 23-33-00).

(8) Close ceiling trim drop panel (Ref. 25-26-01).

(9) Remove tags from inner and outer passenger door handles and switches.


DROP PANEL 273 GB
COMPARTMENT CONTROLLER NO. 4 FS 1735
DROP PANEL 225 EB
DROP PANEL 243 DB
DROP PANEL 273 AB
COMPARTMENT CONTROLLER NO. 3 FS 1525
COMPARTMENT CONTROLLER NO. 1 FS 317
COMPARTMENT CONTROLLER NO. 2 FS 901
MOUNTING SCREW AND WASHER

COMPARTMENT CONTROLLER
(TYP CABIN OVERHEAD INSTALLATION)

HH 8615
M1-0100-23-245

R Compartment Controller - Removal and Installation
R Figure 401

DECODER - REMOVAL AND INSTALLATION

C 1. General

C A. An early fix to the problem of blown fuses in the multiplex C passenger service module decoder was to use a slow-blow fuse C instead of the original fast-blow fuse. A slow-blow fuse C DOES NOT provide the protection needed for the unit and C units with slow-blow fuses have been extensively damaged by C malfunctions without blowing the fuse.

C B. If a Mux PSM decoder with a blown fuse is encountered, C replace it ONCE with a lamp fast-blow fuse, P/N F02A250V1A. C For a check, turn on both reading lights (one for a single C seat) and leave on, operate each call button, and operate C each air control three times. If the fuse blows, change the C unit. If not, turn the lights out, reset the call button, C and sign it off.

C 2. Referenced Procedures

23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test
25-22-03	Passenger Service Outboard Overhead Module - Removal and Installation
25-26-01	Forward, Mid and Aft Ceiling Trim Drop Panels - Removal and Installation

3. Removal/Installation

A. Removal

(1) On left circuit breaker panel, zone 131, open and tag circuit breakers POWER - PASS SERV MDL - 1, 2, 3, 4, 5, 6, 7, and 8 (F2 through F9).

On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY - MULTIPLEXED PASS R SERVICE (E4).

C On Flight Engineer/Second Officers overhead circuit C breaker panel CB2, zone 215, open and tag circuit C breakers PASSENGER ENTERTAINMENT - MULTIPLEX SYSTEM C (D11), and HOST ADVSY IND (C8).

On MULTIPLEXER PSS/PES TEST panel, zone 224 (right forward attendants position), pull and turn service system test selector to SYS OFF (PULL) position.

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Gain access to decoder by opening passenger service outboard overhead module (outboard columns - Ref. 25-22-03), or passenger compartment ceiling drop panel (inboard columns - Ref. 25-26-01).

(3) Disconnect decoder electrical connectors (Ref. Fig. 401).

(4) Remove mounting screws from base, and remove decoder.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

Verify that service system test selector on MULTIPLEXER PSS/PES TEST panel (right forward attendants position) is in SYS OFF (PULL) position.

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Secure decoder to mount with screws (Ref. Fig. 401).

(3) Connect decoder electrical connectors.

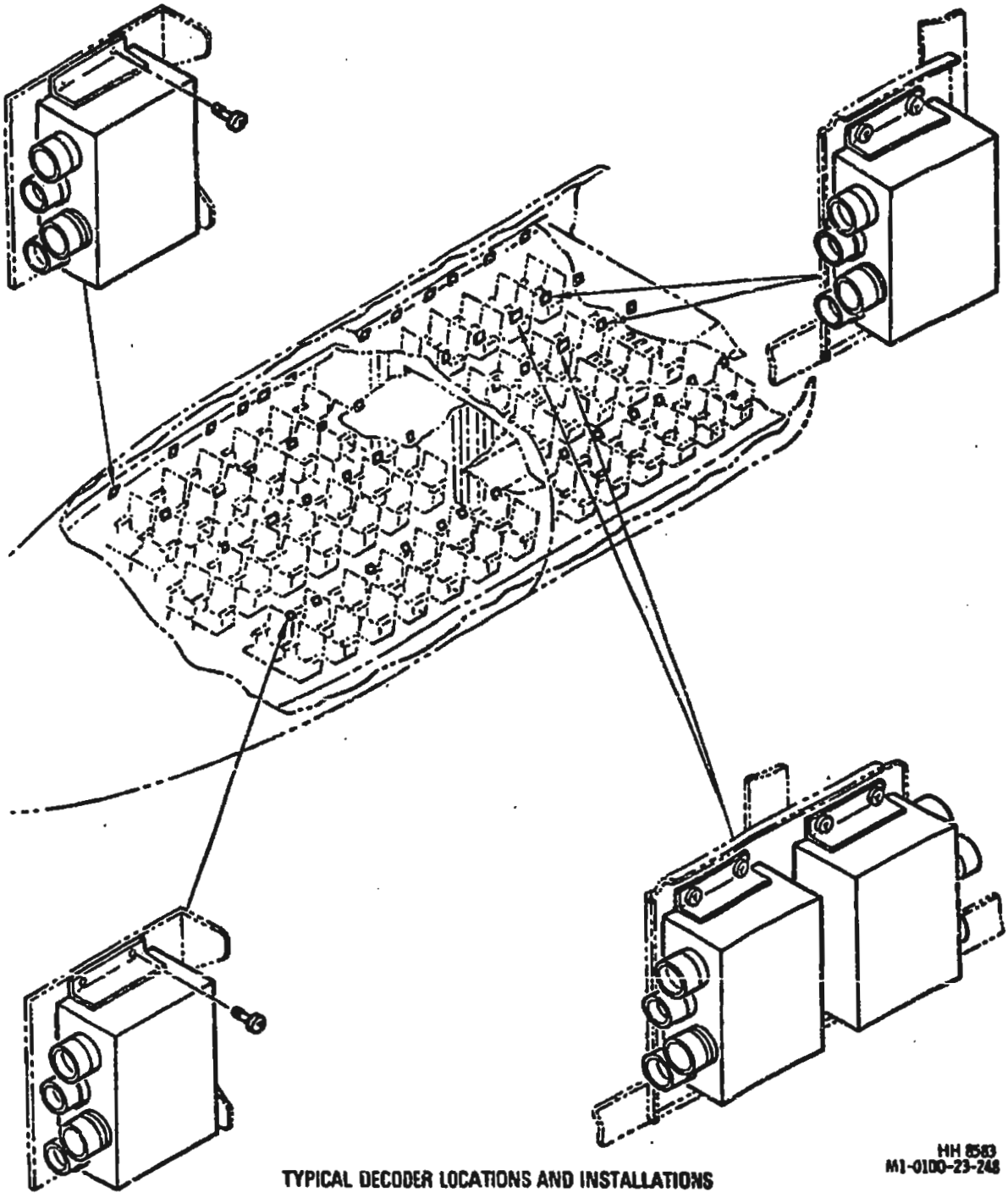
(4) Remove tags and close circuit breakers opened in Step 3A(1).

Turn service system test selector on MULTIPLEXER PSS/PES TEST panel to NORM position.

(5) Perform passenger service system (PSS) BITE test (Ref. 23-33-00).

(6) Close passenger service outboard overhead module (Ref. 25-22-03), or passenger compartment ceiling drop panel (Ref. 25-26-01).

R R (7) Remove tags from inner and outer door handles and switches.



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M1-0100-23-248

TYPICAL DECODER LOCATIONS AND INSTALLATIONS

R Decoder - Removal and Installation
R Figure 401

R
R

LAVATORY SEU (PSS)/ENCODER REMOVAL AND INSTALLATION

1. Referenced Procedures

23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test
25-26-01	Forward, Mid and Aft Ceiling Trim Drop Panels - Removal and Installation

2. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY - MULTIPLEXED PASS SERVICE (4E).

On FE/SO overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers MULTIPLEX SYSTEM - CC 2,3 (D10) and CC 1,4 (D11).

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Lower forward ceiling drop panel 225CB (Ref. 25-26-01) for access to forward two/three seat electronic units (PSS).

(3) Lower aft ceiling drop panel 273MB (Ref. 25-26-01) for access to aft two/three seat electronic units (PSS).

(4) Remove electrical connectors, mounting screws, and two/three seat electronics unit (PSS) (Ref. Fig. 401).

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

WARNING: SERIOUS INJURY CAN OCCUR IF PASSENGER DOOR IS OPERATED WITH PERSONNEL IN AREA OVERHEAD. TAG INNER AND OUTER DOOR HANDLES AND SWITCHES TO PREVENT DOOR OPERATION.

(2) Position two/three seat electronics unit (PSS) on rack and install mounting screws (Ref. Fig. 401).

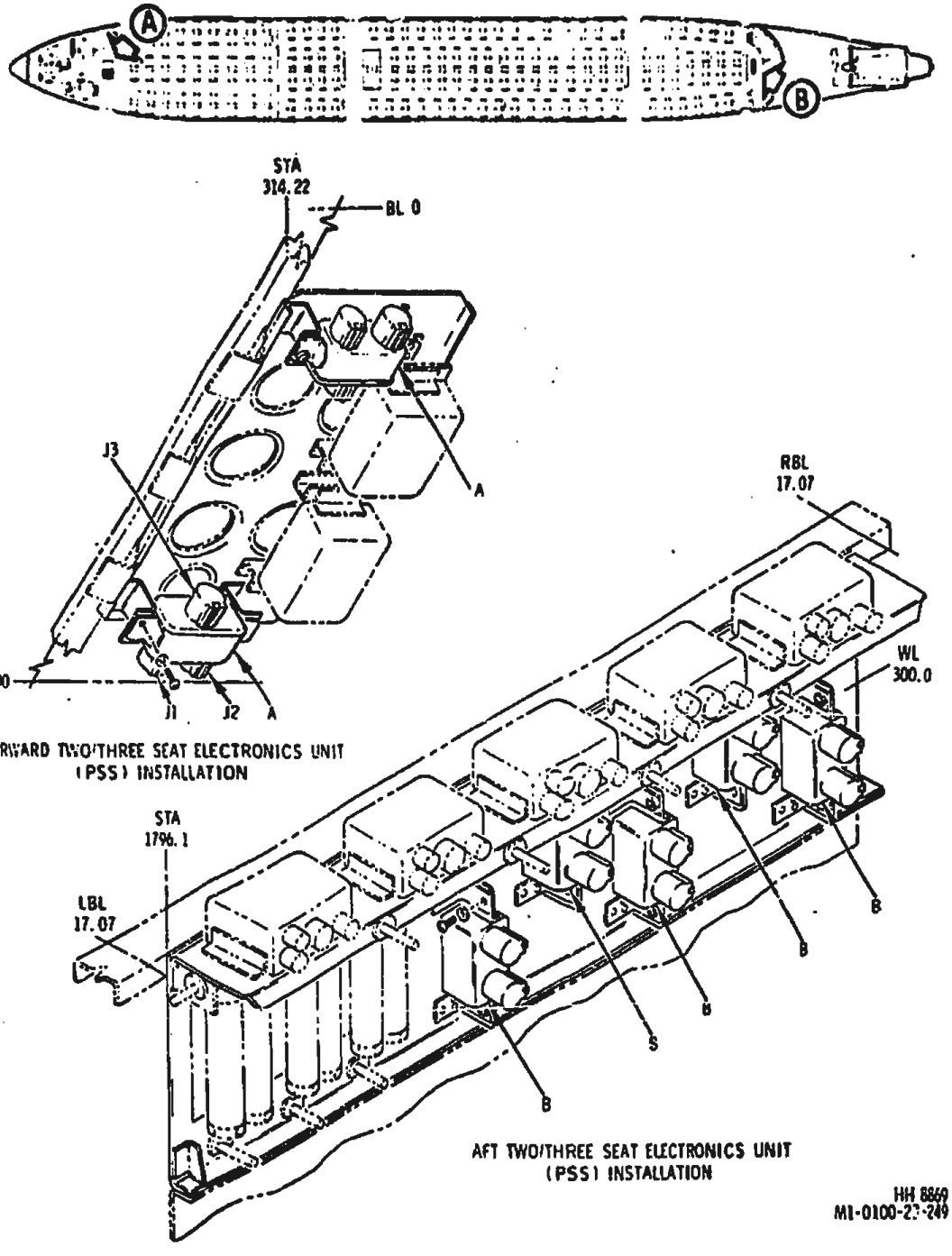
(3) Connect electrical connectors.

(4) Remove tags and close circuit breakers opened in Step 2A(1).

(5) Perform passenger service system (PSS) operational test (Ref. 23-33-00).

(6) Close ceiling drop panel (Ref. 25-26-01).

(7) If passenger door handles and switches were tagged to prevent operation, remove tags.



R Lavatory SEU (PSS)/Encoder - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

001B

POWER SUPPLY - REMOVAL AND INSTALLATION

1. Referenced Procedures

20-23-02	Rack Mounted ARINC Box Lever Latch - Maintenance Practices
23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY MULTIPLEXED PASS SERVICE (4E).

(2) In mid electrical service center, zone 137, locate power supply on left equipment rack (Ref. Fig. 401).

(3) Release locking mechanism in each of the two camloc handles of the power supply and pull forward until connectors at rear of power supply disconnect, then remove power supply.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

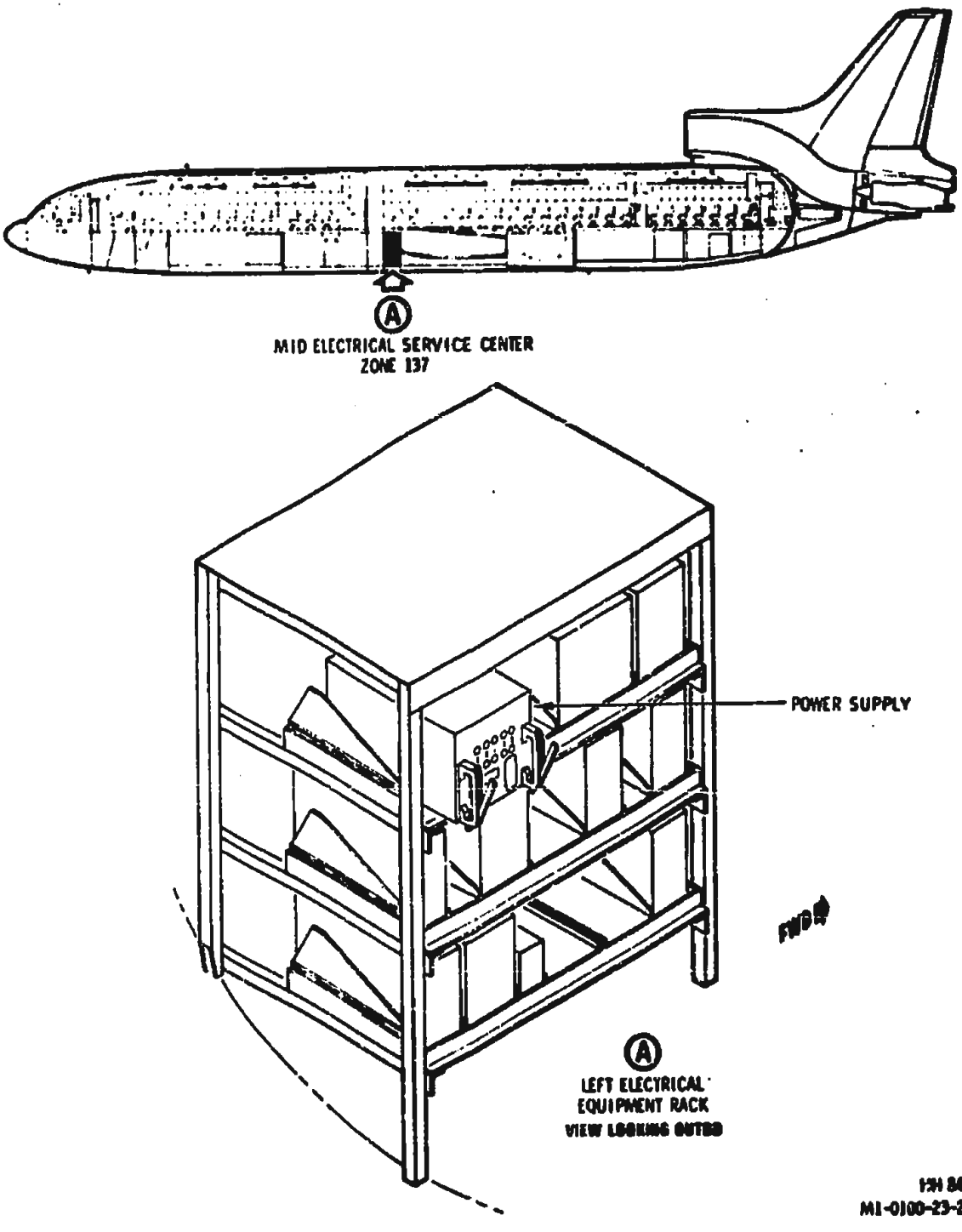
(2) In mid electrical service center, zone 137, position power supply at left equipment rack (Ref. Fig. 401).

(3) Slide power supply into rack until connectors mate and power supply fits tightly against connectors.

(4) Verify that handle mechanisms on both handles (Ref. 20-23-02) have engaged rack mounting brackets and power supply is securely held in place.

(5) Remove tag and close circuit breaker opened in Step 2A(1).

(6) Turn on electrical power (Ref. 24-00-00).



Power Supply - Removal and Installation
Figure 401

(7) On MULTIPLEXER PSS/PES TEST panel (right forward attendant position, zone 224), verify that service system test selector is in NORM position.

(8) On power supply front panel, verify that all push-pull-type circuit breakers are pushed in, and that POWER - CB1 is in NORMAL position.

(9) Select UNIT TEST switch first to A, and then to B (Ref. 23-33-00).

Verify that TEST OK light comes on at both positions.

Release switch.

(10) At right forward attendants position, zone 224, on MULTIPLEXER PSS/PES TEST panel, select POWER SUPPLY switch first to A, and then to B.

Verify that TEST OK light comes on at both positions.

(11) Turn off electrical power (Ref. 24-00-00).

MULTIPLEXER PSS/PES TEST PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedure

23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit
R breakers PASSENGER ENTERTAINMENT - MULTIPLEX SYSTEM -
R CC 2, 3(D10) and CC 1, 4 (D11).

On galley left circuit breaker panel, zone 131, open and tag circuit breakers AUDIO ENTERTAINMENT - SUBMULTIPLEXER - FWD, MID-AFT, and AFT (10E through 12E).

On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY - MULTIPLEXED PASS SERVICE (4E).

(2) At forward right attendant position, zone 224, open access door above and outboard of attendant seat (Ref. Fig. 401).

(3) Remove mounting screws from right base of multiplexer PSS/PES test panel and loosen mounting screws in left base.

(4) Slide multiplexer PSS/PES test panel to right so mounting screws disengage through slots in left base.

(5) Disconnect electrical plug from rear connector and remove panel.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

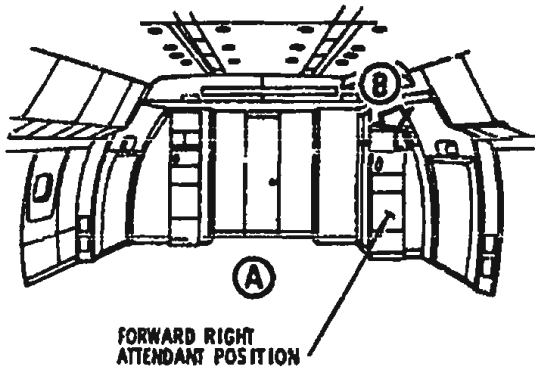
(2) Connect electrical plug to rear connector on multiplexer PSS/PES test panel.

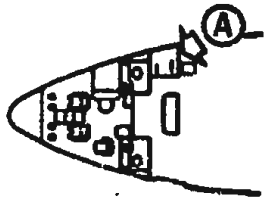
(3) Slide left slotted base onto mounting screws (Ref. Fig. 401).

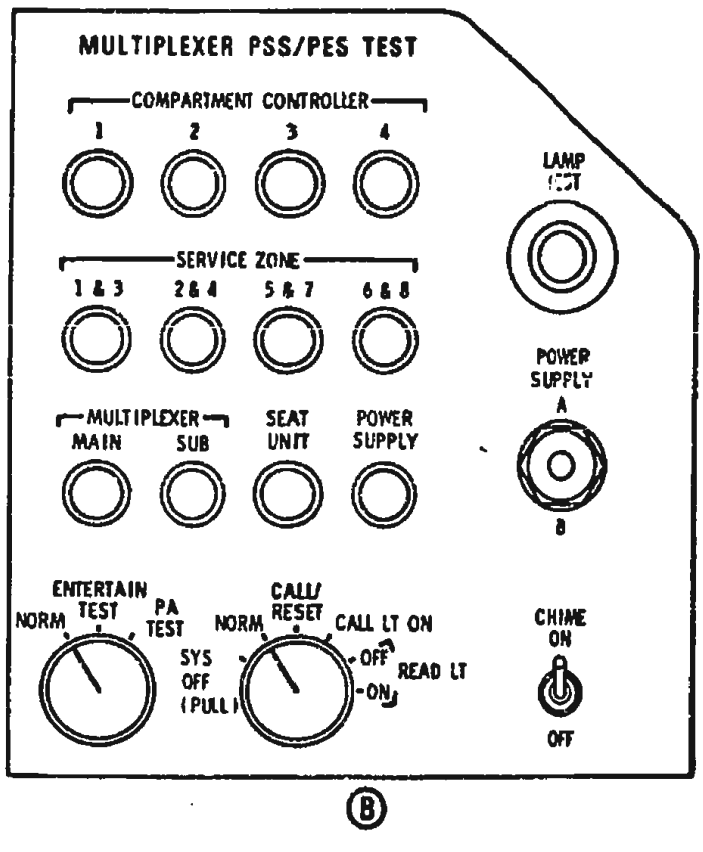
(4) Insert right base mounting screws and tighten all mounting screws.

(5) Remove tags and close circuit breakers opened in Step 2A(1).

R (6) Perform PSS/PES Functional/Operational Test (Ref. 23-33-00).







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Multiplexer PSS/PES Test Panel - Removal and Installation
Figure 401

R
R
001B

EFFECTIVITY: ALL

MULTIPLEX CABLE - APPROVED REPAIRS

1. General

If a multiplex system seat-to-underfloor disconnect cable is damaged so that it is too short to repair by re-terminating the connector, it can be repaired by cutting the cable below the passenger compartment floor, attaching a receptacle, and adding a seat-to-seat-type cable.

2. Equipment and Materials

Seat-to-seat cable, part number 1019916-(dash number indicates cable length; select length to suit installation)

Seat electronic units (SEU), part number 275D508 (for test only)

Passenger control units (PCU), part number 168365-01 or -02 (for test only)

Cables, PCU-to-SEU, part number 168248, 168249, 168250, 168251, 168252, 168419, or 168668, or fabricate (Ref. 23-33-00, Seat Electronics Test Assembly schematic) (for test only)

Receptacle with pins, part number BEE-0C06SC (Vendor code 27832; Hughes Aircraft Co., Newport Beach Division, 500 Superior Avenue, Newport Beach, Calif.)

Clamp, part number NAS1715D17KW or LS14968D17AS, or equivalent

Clamp, part number LS9345-5, LS14968D5AS, or NAS1715D5K, or equivalent

Special tools for Hughes BEE connector assembly (Ref. Wiring Diagram manual 20-22-03)

3. Referenced Procedures

20-22-03	Wiring Diagram Manual - General Purpose Area, Hughes Connectors BEE 0, BEE 2, and BEE 6
23-33-00	Passenger Audio Entertainment and Service System - Fault Isolation
23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test

23-33-13	Illustrated Parts Catalog - Seat Electronics Unit installation, Forward Cabin (also Ref. 23-33-14 and -15 for Mid and Aft Cabin)
24-00-00	Electrical Power - Maintenance Practices
25-21-04	First Class Platform-Type Double Seat Assembly - Removal and Installation
25-21-05	Coach Class Platform-Type Double Seat Assembly - Removal and Installation
25-25-05	Carpet Section - Removal and Installation
53-22-00	Floor Panels, Flight Station, Passenger Compartment, and Galley

4. Approved Repairs

A. Seat-to-Underfloor Disconnect Cable

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breakers AUDIO ENTERTAINMENT - SUB MULTIPLEXER - FWD, MID-AFT, and AFT; and POWER - PASS. SVCE MDL - 1, 2, 3, 4, 5, 6, 7, and 8.

On galley right circuit breaker panel, zone 131, open and tag circuit breaker POWER SUPPLY MULTIPLEXED PASS. SERVICE.

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker MULTIPLEX SYSTEM (D11).

(3) If necessary for access to disconnect cable, remove passenger seats and carpet sections to expose floor panels (Ref. 25-21-04 or 25-21-05, and 25-25-05); then remove floor panel for access to underfloor disconnect cable (Ref. 53-22-00).

(4) Cut the damaged cable at a location under the passenger compartment floor, leaving enough cable length to allow installation of a receptacle, and to reach a convenient location for securing the receptacle under the passenger floor with a clamp.

Note length of damaged cable section, then discard.

WARNING: CABLE AND CONNECTOR MUST BE SECURED SO THAT NO INTERFERENCE WITH FLIGHT CONTROL CABLES IS POSSIBLE.

R (5) Install a BEE-0C06SC receptacle on the cable (Ref. Wiring Diagram Manual 20-22-03 for special tools and assembly instructions).

R WARNING: DO NOT DRILL HOLES IN FATIGUE-CRITICAL AREAS SUCH AS BEAM CAPS AND FUSELAGE FRAMES (REF. STRUCTURAL REPAIR MANUAL 51-00-00).

R (6) Secure the receptacle and cable in a convenient location, using existing fasteners and holes if possible. Use a part number NAS1715D17KW clamp to secure the receptacle, and part number LS9345-5 clamps (as necessary) to secure the cable.

R (7) Select a part number 1019916-(XXX) seat-to-seat cable of approximately the same length as the discarded cable section (Ref. Illustrated Parts Catalog 23-33-13, -14, and -15; dash number indicates cable length). Connect seat-to-seat cable to receptacle, and secure cable connector with a part number NAS1715D17KW clamp. If it is necessary to secure the cable, use a LS9345-5 clamp. Use existing fasteners and holes if possible.

R (8) If no floor panels were removed, proceed to Step (11). If any floor panels were removed, test system as follows:

R CAUTION: DO NOT CONNECT OR DISCONNECT ANY SYSTEM CABLE OR COMPONENT WITHOUT OPENING ALL CIRCUIT BREAKERS LISTED IN STEPS 4A (1) AND (2).

R Substitute a seat electronics test assembly for each seat group which was removed (Ref. 23-33-00, Seat Electronics Test Assembly schematic). Use part number 1019916 seat-to-seat cables of any convenient length to connect SEU-to-SEU to complete seat column for test. Connect one end SEU to seat-to-underfloor disconnect, and other end SEU to SEU on nearest seat

R Perform BITE test of PSS/PES (Ref. 23-33-00 Adjustment and Test). Do not turn off electrical power at end of test.

R Open circuit breakers which were opened in Steps 4A(1) and (2), and disconnect SEU and cables used for test.

R (9) Replace floor panel (Ref. 53-22-00).

R (10) Replace carpet sections and passenger seats (Ref. 25-25-05, and 25-21-04 or 25-21-05).

(11) Verify that all seat-to-seat and seat-to-underfloor disconnect cables are securely connected.

(12) Perform BITE test of PSS/PES (Ref. 23-33-00 Adjustment and Test). If system was tested in Step (8), repeat test.

(13) Turn off electrical power (Ref. 24-00-00).

CR 5. Multiplex System Seat Electronic Unit Connectors - Approved Repairs and Conditions

CR A. Repairs

CR (1) Any time multiplex system seat electronic unit connectors are disconnected for any reason, this repair may be performed to aid in preventing inadvertent release of connectors.

CR B. Approved Conditions

CR (1) Cables may be used with any or all of the following conditions:

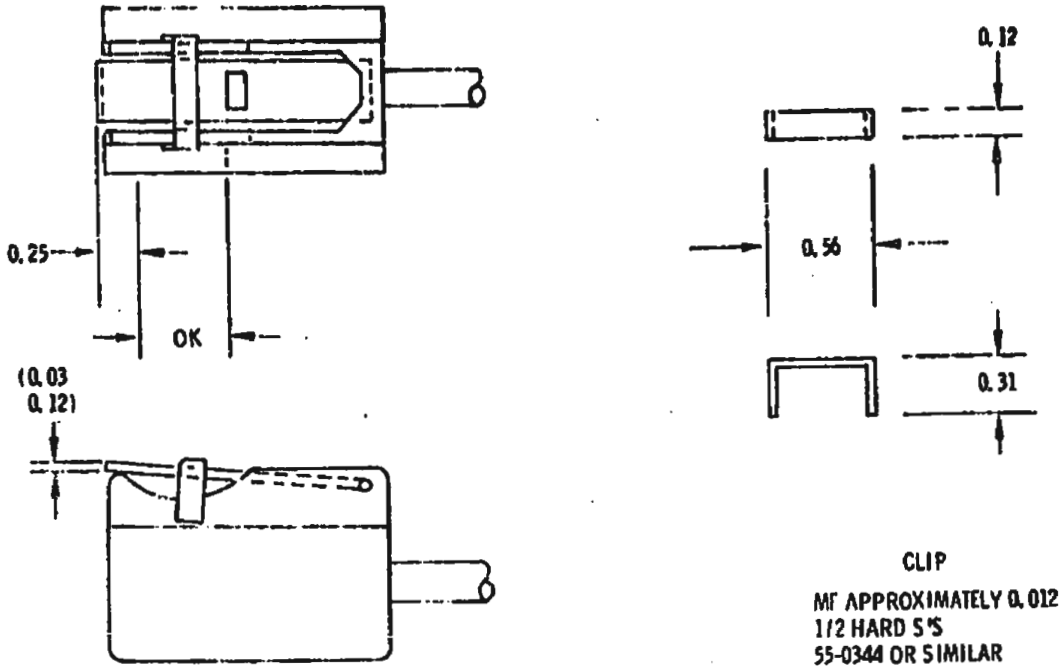
CR (a) The outer jacket of the cable may be frayed or scuffed provided there is no damage to the inner wires and the electrical continuity test is OK.

CR (b) The plastic stops which normally limit the travel of the connector latch may be broken allowing the latch to rotate up to approximately 100 degrees provided the latch hinge is secure and the cable latches with tester normally. This condition may or may not be repaired by installing a clip as shown in Figure 801.

CR (c) Engineering Repair 23-161 (see Figure 802) may or may not be accomplished.

CR C. Alternate SEU Connector Approved Repair

CR See Figure 803.



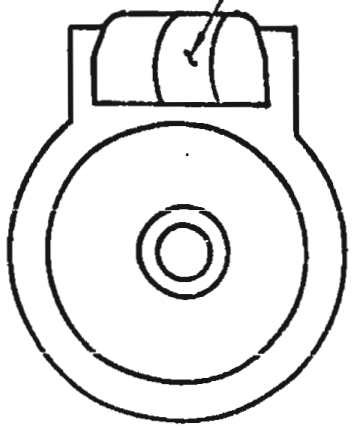
INSTALL CLIP ON PLUG
WITH MVP11 50-1356
APPROXIMATELY AS SHOWN

CLIP
MF APPROXIMATELY 0.012
1/2 HARD S'S
55-0344 OR SIMILAR

M1-0000-23-4224

CR
CR
Seat Electronic Unit Connector Approved Repair
Figure 801

R EFFECTIVITY: ALL
R
001B


APPLY A PILLAR OF RTV 162 SILASTIC, TWA STK. NBR. 50-1200, 1/8 TO 3/16 INCHES WIDE AS SHOWN. INSURE THE SILASTIC HAS ADHERED TO THE RELEASE LEVER AND TO THE CONNECTOR BODY BEFORE INSERTING INTO SEAT ELECTRONIC UNIT

CONNECTOR - CABLE END VIEW

CAUTION

DO NOT APPLY A PILLAR WIDER THAN THAT SHOWN NOR EXTRUDE SILASTIC TOO FAR UNDER THE LEVER OR DIFFICULTY IN CONNECTOR REMOVAL WILL RESULT

NOTE

RTV 162 CURES TACK-FREE IN APPROXIMATELY 2 HOURS - FULL CURE IN 24 HOURS, DEPENDING ON THICKNESS, HUMIDITY, ETC.

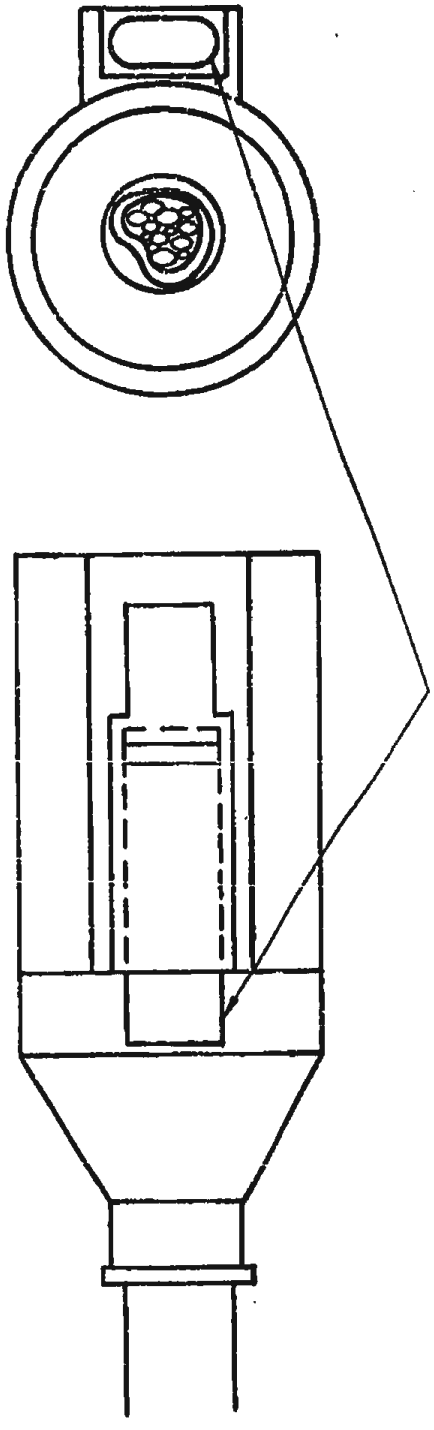
MI-0000-23-4225

CR
CR

Seat Electronic Unit Connector Approved Repair
Figure 802

R
R
001B

EFFECTIVITY: ALL


INSERT A PIECE OF CLEAR PLASTIC TUBING (TWA P/N 41-2456) APPROXIMATELY 1.2 INCH IN LENGTH, UNDER THE LOCKING CLIP OF THE MULTIPLEX INTERSEAT CONNECTING CABLE CONNECTOR. WHEN INSTALLED, APPROXIMATELY 1/8 INCH OF THE TUBING IS PROTRUDING FROM THE BACK OF THE LOCKING CLIP OF THE CONNECTOR

MI-0000-23-4226

CR
CR

Seat Electronic Unit Connector Approved Repair
Figure 803

R
R
001B

EFFECTIVITY: ALL

C PASSENGER VISUAL ENTERTAINMENT SYSTEM - DESCRIPTION AND OPERATION

C 1. General

C The passenger visual entertainment system provides motion
C picture entertainment for passengers in three separate cabin
CR locations (Ref. Fig. 1). Each area has its own movie projector,
C movie screen, and control panel. The movie screens are attached
CR to the bulkhead. The soundtrack audio circuits interface with
C the audio entertainment system (Ref. 23-33-00) enabling
C passengers to receive the movie sound through their individual
C seat headsets. A master power OFF switchlight, located in the
CR flight station, functions to control the power supplies to the
C projectors. The major components in the system and their
C locations are as follows:

C	COMPONENT	LOCATION
C	Projector No. 1	Forward Cabin FS 549
C		Centerline Overhead
CR	Projector No. 1A	Zone C cabin FS 820
CR		Centerline Overhead
C	Projector No. 2	Mid-aft Cabin FS 1143
C		Centerline Overhead
C	Projector No. 3	Aft Cabin FS 1705
C		Centerline Overhead
CR	Control Panel No. 1 and 1A	Stowage Rack End Panel
CR	(controls for both on same	Forward of No. 2 Door
CR	panel)	9Left)
C	Control Panel No. 2	Stowage Rack End Panel
C		Forward of No. 3 Door
C		(Left)
C	Control Panel No. 3	Aft Cabin Attendants Seat
C		Position (Left)

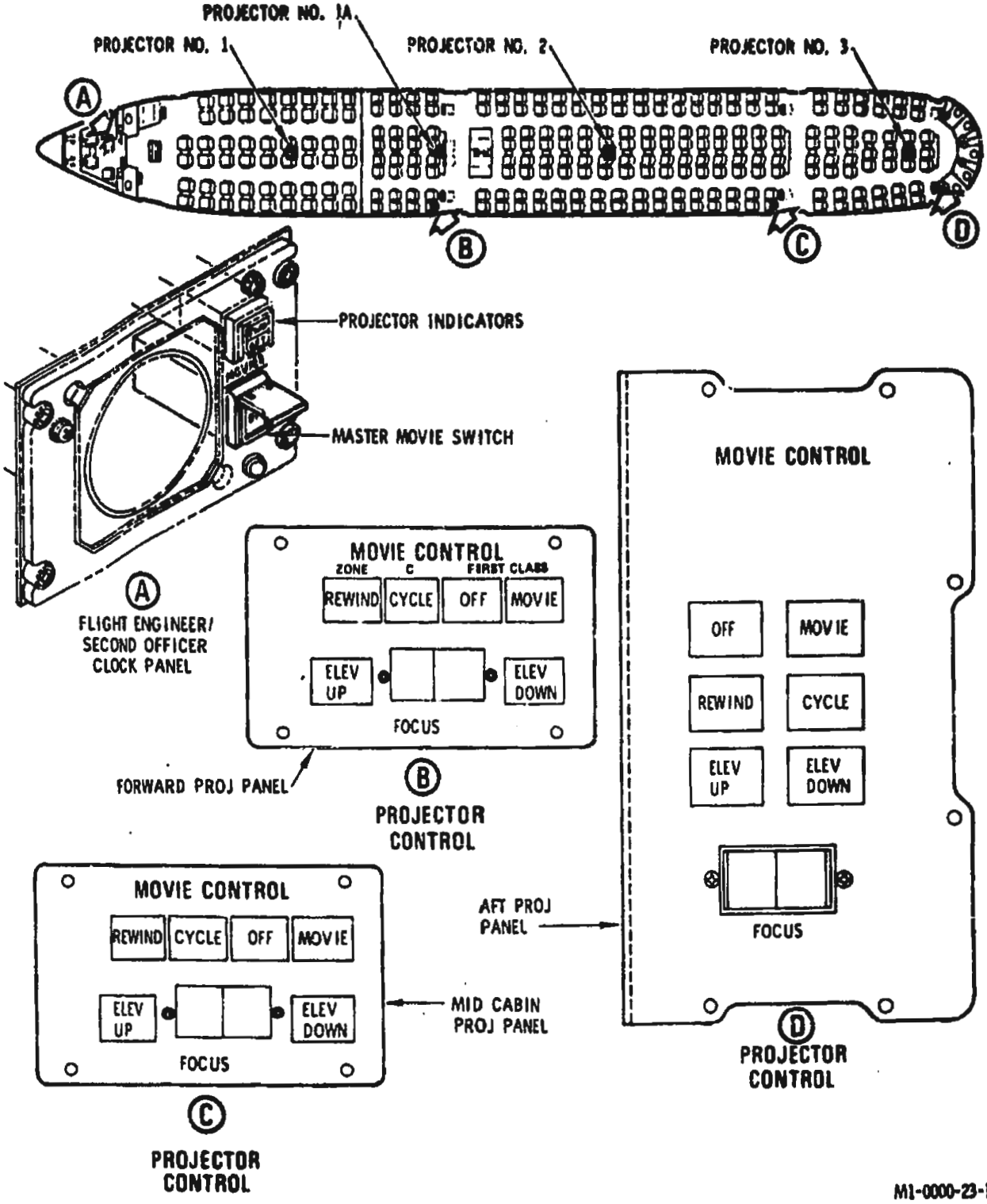
C C	Master Movie Off Relay	Mid Electrical Service Center Relay Panel
C C	Circuits Breakers	Mid Electric Service Center, LH
C C	Master Power Off Switchlight	Flight Engineer/Second Officers Clock Panel
C C	Movie On Indicators	Flight Engineer/Second Officers Clock Panel
C C	No. 1 Projector Movie In Use Relay	Forward Cabin Relay Panel Right Side

CR Projectors 1, 2, and 3 are mounted in an elevator assembly which normally is all kept above the cabin ceiling. A mirror assembly is mounted on the bottom of the projector to direct the light beam to the screen. For servicing, the elevator lowers the projector to a height convenient for working from the cabin floor.

CR CR CR CR Projector 1A is located in the pod hanging down from the ceiling at the aft end of Zone C. The light beam shines forward thru a hole in the forward side of the pod. The projector is mounted on the bottom door of the pod which hinges down for servicing.

Each projector operation and control is independent of the others. Also, each projector receives power separately through three sets of circuit breakers. A master relay switches 28V dc control power to all three projectors. It is controlled by a single OFF switchlight located on the Flight Engineer/Second Officers clock panel. When in the OFF (depressed and latched) position, the OFF light is on, indicating 28V dc control power is not available at the projectors. When in the on (released) position, the OFF light is out indicating control power is available at the projector. The purpose of the OFF switch is to give the flight station a master control over all three projector systems during emergency conditions.

A FWD/AFT indicator, also located on the Flight Engineer/Second Officers clock panel, provides a flight station projector-in-use indication. The FWD indicator comes on when the No. 1 projector is energized for operation, and the AFT indicator comes on with either or both No. 2 and No. 3 projectors are energized. When the No. 1 projector is enabled, the No. 1 projector-in-use relay is energized. In the energized condition, the projector-in-use relay contacts open the forward lavatory occupied sign circuit



M1-0000-23-1537

CR Passenger Visual Entertainment System Equipment and Location
CR Figure 1

EFFECTIVITY: ALL

007B

(Ref. 33-27-00). This prevents sign light interference with the No. 1 projector screen.

Each MOVIE CONTROL panel is located so that the operator can control the projector while observing the projected image. The MOVIE CONTROL panels have identical indicators and controls (Ref. Table 1).

Projector Indicators and Controls
Table 1

ITEM	COMPONENT	DESIGNATION
C	Switchlight (White)	MOVIE
R	Switch	FOCUS (Not Used)
	Switchlight (Blue)	OFF
CR	Switchlight (White)	CYCLE (Not Used)
CR CR	Switchlight (White)	REWIND (Not Used)
CR	Switchlight (Blue)	ELEV UP
CR	Switchlight (Blue)	ELEV DOWN

The MOVIE switchlight energizes the projector. The switchlight is a momentary type with a MOVIE indicator that comes on after the switchlight is pressed.

The OFF switchlight deenergizes the projector. The OFF indicator illuminates when the switchlight is depressed and latched, indicating that the projector circuits are denergized. When the OFF switchlight is depressed, all other movie system indicator lights are off.

The ELEV UP and ELEV DOWN switchlights control the raising and lowering of the elevator. Both are momentary type switches, and each will illuminate only when the elevator is going up or down, as appropriate. These switches are wired in parallel with another pair of ELEV UP and ELEV DOWN switches located on the bottom of the shroud covering the mirror assembly and elevator.

The REWIND, CYCLE, and FOCUS switches are provisions for functions which are not used with the present movie system.

Power to operate the visual entertainment system is supplied by the 115V ac, 400-Hz, three-phase ground service extension buses, two and three left, and the 28V dc ground service extension bus,

through 12 circuit breakers. All circuit breakers are located on the left galley circuit breaker panel. Each projector
CR receives its 115V ac power directly from 12 MOVIE PROJECTOR
CR circuit breakers (three each projector) designated 1, 1A, 2, and
CR 3 respectively for the four projectors. The 28V dc control
CR power is supplied through four MOVIE PROJECTOR circuit breakers
CR (one each projector) designated 1, 1A, 2, and 3 respectively. From the circuit breaker the 28V dc power is routed through the master power relay before being applied to the projectors.

2. Operation

When the OFF switchlight, located on the Flight Engineer/Second Officers clock panel, is pressed the OFF indicator goes off, and a ground return is applied to the master movie off relay coil (Ref. Fig. 2).

C The master movie off relay energizes and completes the control
C power circuit between each 28V dc MOVIE PROJECTOR (1, 1A, 2 and
CR 3) circuit breaker, and its respective projector. Also, the OFF
C switchlight on each projector control panel comes on. Except
C for the MOVIES indicator on the Flight Engineer/Second Officers
CR clock panel and the first class movie in-use relay, all four
C projector control circuits operate identically. The following
CR modes of operation apply to all four projectors except where
C noted.

C A. MOVIE mode

C When the MOVIE switchlight is momentarily pressed a ground
C return is applied to the projector relay circuit. The relay
C circuit latches and enables the reel drive motor, lamp, and
C sound circuits. The 28V dc at the OFF indicator switchlight
C is removed and the OFF indicator goes off; 28V dc is applied
C to the MOVIE switchlight, and its indicator comes on. The
C projector projects the movie image on the screen. Sound
C track audio is amplified in the projector then routed to the
C audio entertainment and service system (Ref. 23-33-00).

C When the No. 1 projector is energized, 28V dc is applied to
C the No. 1 projector movie in-use relay, and the FWD
C indicator on the Flight Engineer/Second Officers clock
C panel. The FWD indicator comes on, and the movie in-use
C relay energizes. Contacts of the movie in-use relay open
CR the two forward lavatory occupied signs circuit. When
CR projectors No. 1A, 2 and/or 3 are energized, 28V dc is
C applied to the AFT indicator on the Flight Engineer/Second
C Officers clock panel. The AFT indicator comes on.

C B. FOCUS Mode (Not used with present system)

C When the FOCUS switch is operated in one direction (with the
C MOVIE switchlight on), 28V dc and a ground return is applied
C to the focus lens circuit. The lens focal length increases
C until the FOCUS switch is released or the projector focus
C limit switches are actuated. When the FOCUS switch is
C operated in the opposite direction, the 28V dc and ground
C return are reversed and applied to the focus lens circuit.
C The lens focal length will decrease until the FOCUS switch
C is released or the projector focus limit switches are
C actuated.

C C. CYCLE Mode (Not used with present system)

C When the CYCLE switchlight is pressed, a ground return is
C applied to the projector cycle mode relay circuit. The
C cycle mode relay circuit latches. The relay circuit applies
C 28V dc to the CYCLE switchlight, and enables the reel drive
C motor circuit. The CYCLE indicator comes on, and the real
C drive motor drives the film in the normal (forward)
C direction. The sound and light circuits are not energized
C in this mode. Film rotation will continue until either the
C OFF switchlight is pressed or the take-up real limit
C switches are actuated to open the cycle circuit.

C D. OFF Mode

CR When the OFF switchlight is pressed, a ground return is
CR opened to the projector relay stop circuit. The relay
CR circuit is relaxed to a stop condition and all projector
C circuits are de-energized. The relay circuit applies 28V dc
C to the OFF switchlight and the indicator comes on.

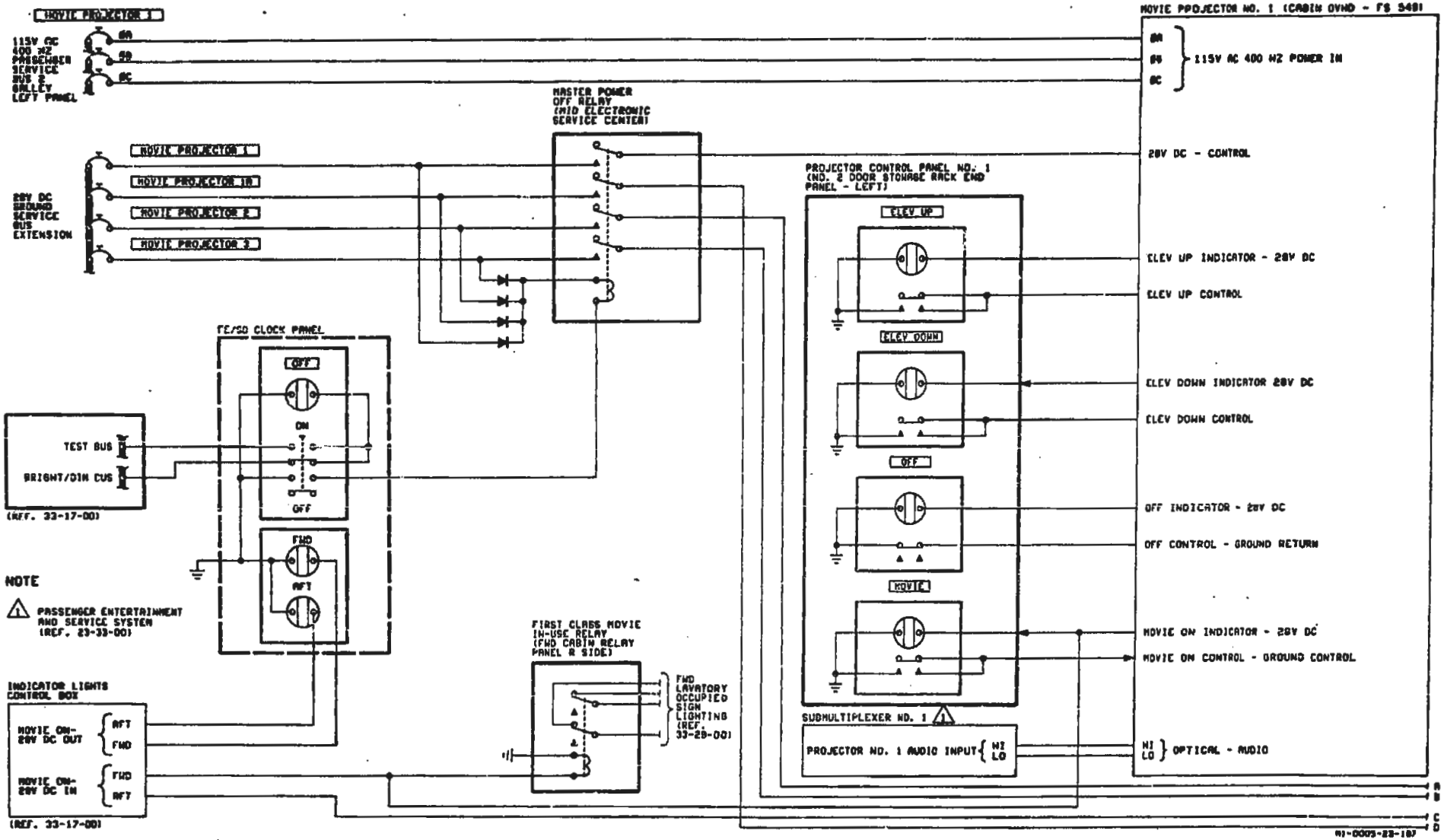
C The following operational modes apply to Bell and Howell
C projector installation only. With an Inflight Motion Pictures
C projector installation, these controls are not used.

C E. REWIND Mode (Not used with present system)

C When the REWIND switchlight is pressed, a ground return is
C applied to the projector rewind relay circuit. The relay
C circuit latches and reverses two phases of the reel drive
C motor 115V ac supply. The reel drive circuit operates in a
C reverse direction to rewind the film from the take-up to the
C supply reel. The sound and light circuits are not energized
C in this mode. Film rewinding continues until either the OFF
C switchlight is pressed or the reel limit switches are
C actuated by the film.

C H. MOVIE 1 and 2 Modes

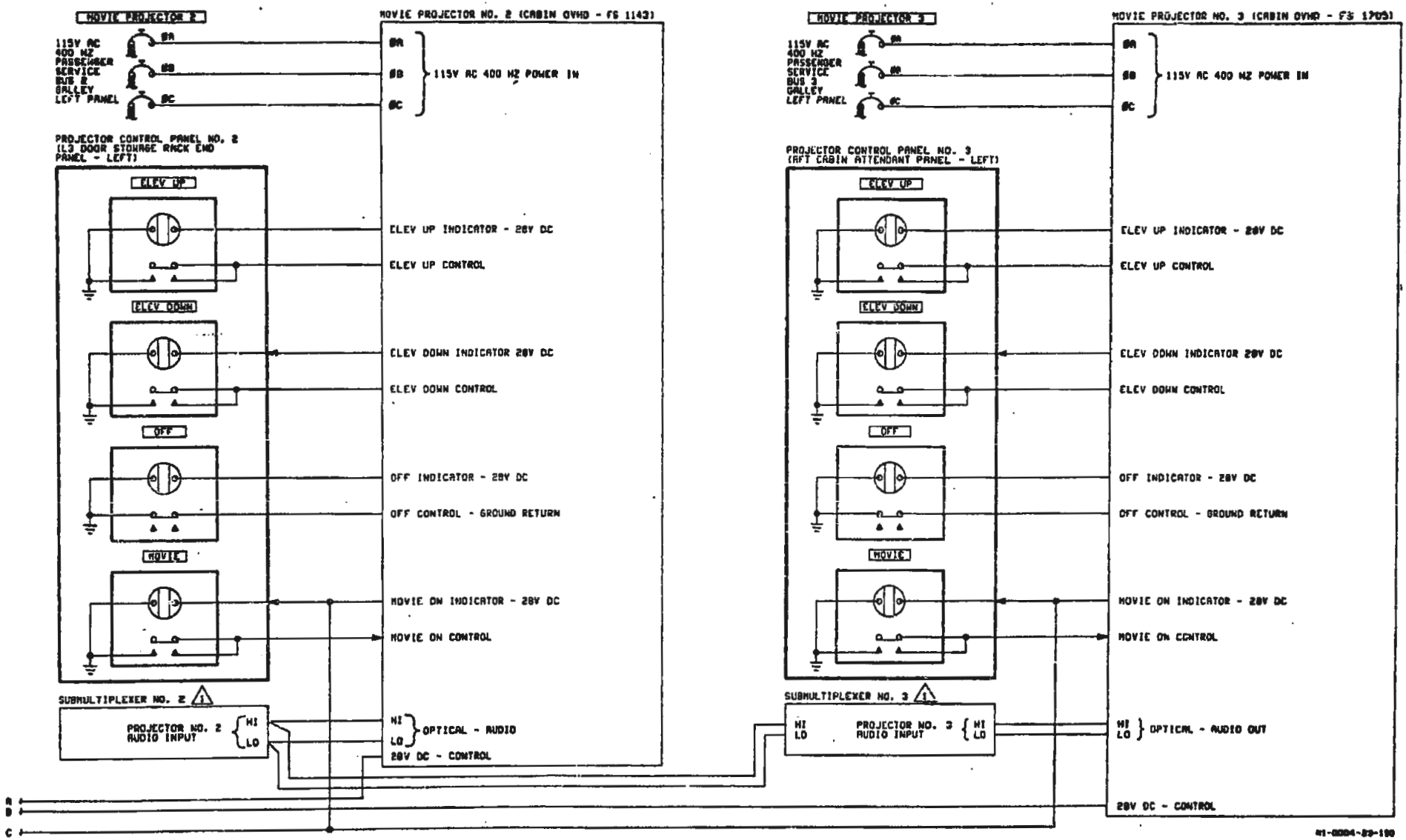
C MOVIE 1 and 2 indicators receive 28V dc from the projector
C mode relay circuit when the respective film (No. 1 and No.



CR Passenger Visual Entertainment System Block Diagram
CR Figure 2 (Sheet 1)

EFFECTIVITY: ALL

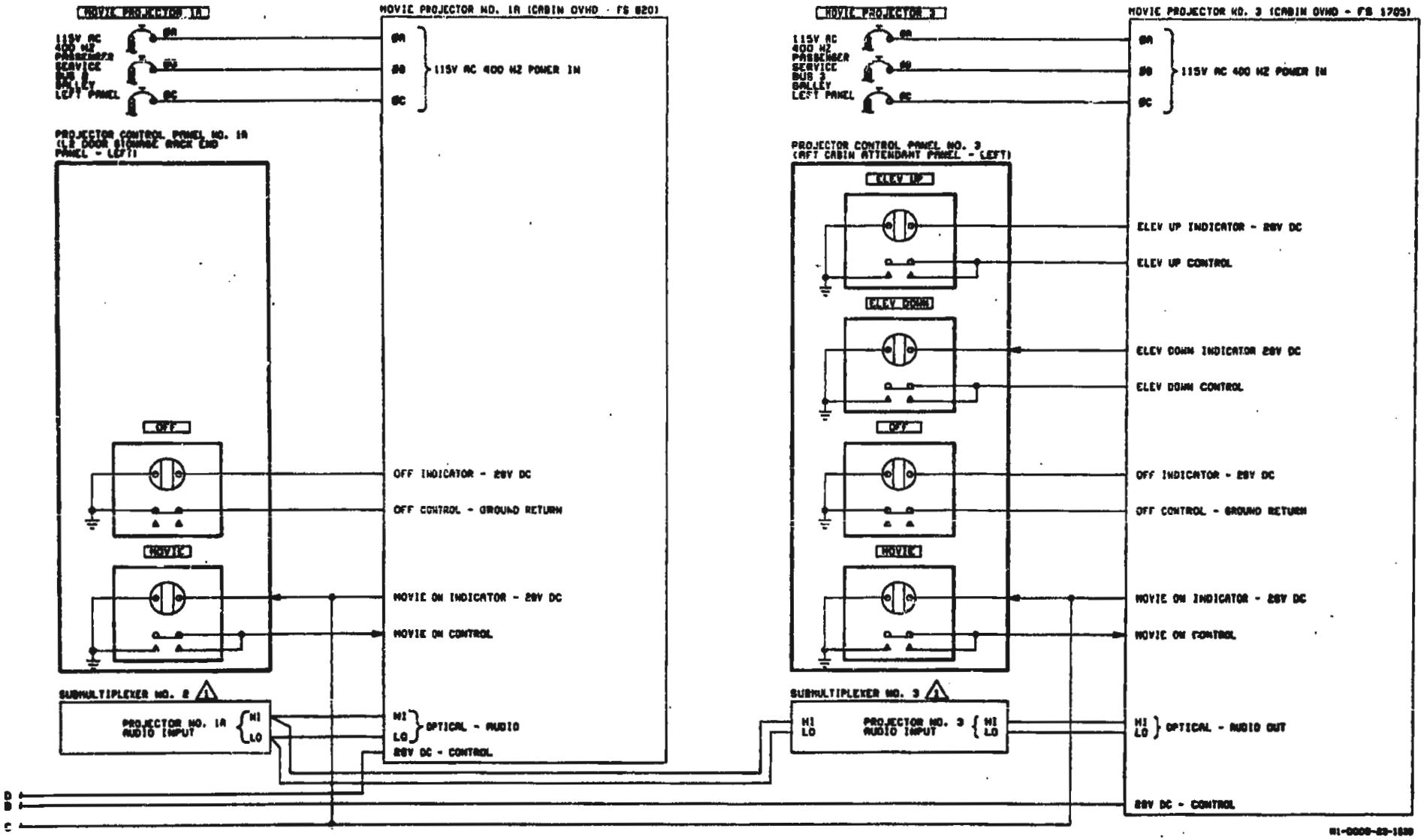
0078



CR Passenger Visual Entertainment System Block Diagram
CR Figure 2 (Sheet 2)

EFFECTIVITY: ALL

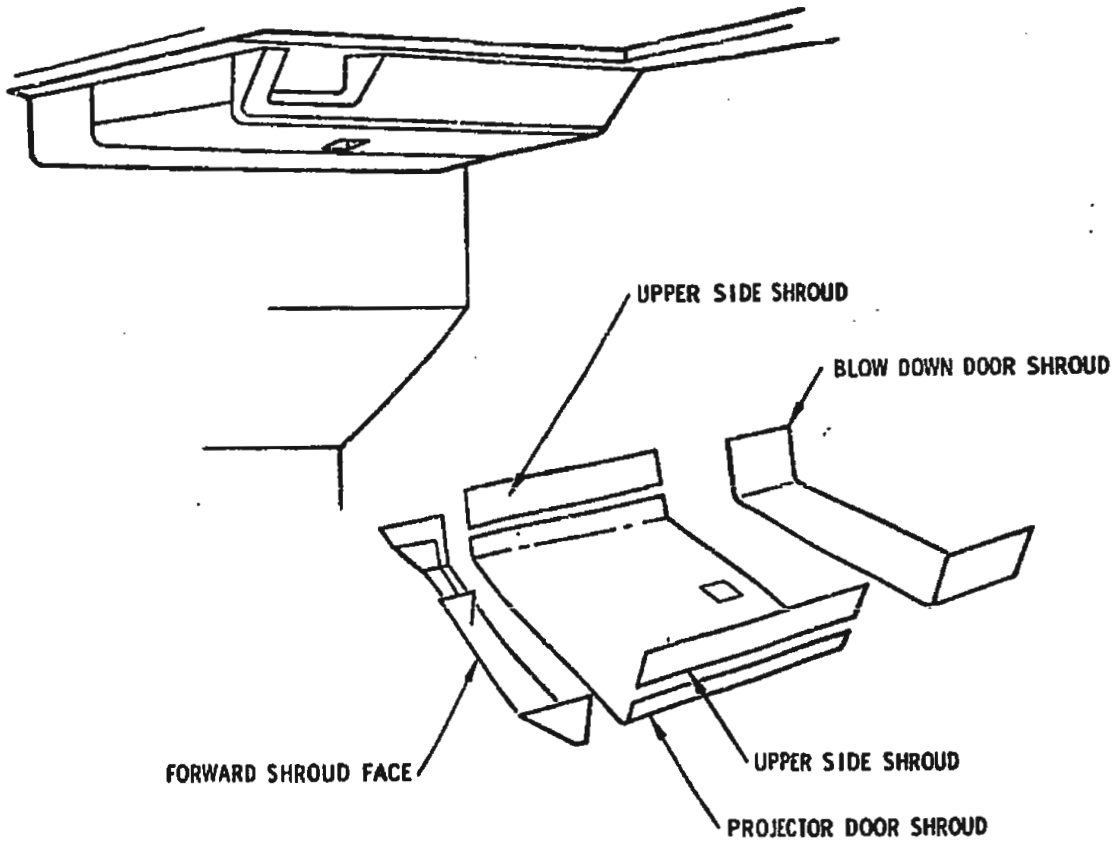
007B


MOVIE PROJECTOR 1A
MOVIE PROJECTOR NO. 1A (CABIN OVHD - FS 820)
115V AC 400 HZ PASSENGER SERVICE BUS 2 GALLEY LEFT PANEL
115V AC 400 HZ POWER IN
PROJECTOR CONTROL PANEL NO. 1A (LH DOOR STORAGE RACK END PANEL - LEFT)
OFF
MOVIE
OFF INDICATOR - 28V DC
OFF CONTROL - GROUND RETURN
MOVIE ON INDICATOR - 28V DC
MOVIE ON CONTROL
SUBMULTIPLEXER NO. 2
PROJECTOR NO. 1A AUDIO INPUT
HI
LO
OPTICAL - AUDIO
28V DC - CONTROL
MOVIE PROJECTOR 3
MOVIE PROJECTOR NO. 3 (CABIN OVHD - FS 1705)
PROJECTOR CONTROL PANEL NO. 3 (AFT CABIN ATTENDANT PANEL - LEFT)
ELEV UP
ELEV DOWN
ELEV UP INDICATOR - 28V DC
ELEV UP CONTROL
ELEV DOWN INDICATOR 28V DC
ELEV DOWN CONTROL
SUBMULTIPLEXER NO. 3
PROJECTOR NO. 3 AUDIO INPUT
OPTICAL - AUDIO OUT

CR Passenger Visual Entertainment System Block Diagram
CR Figure 2 (Sheet 3)

EFFECTIVITY: ALL

007B



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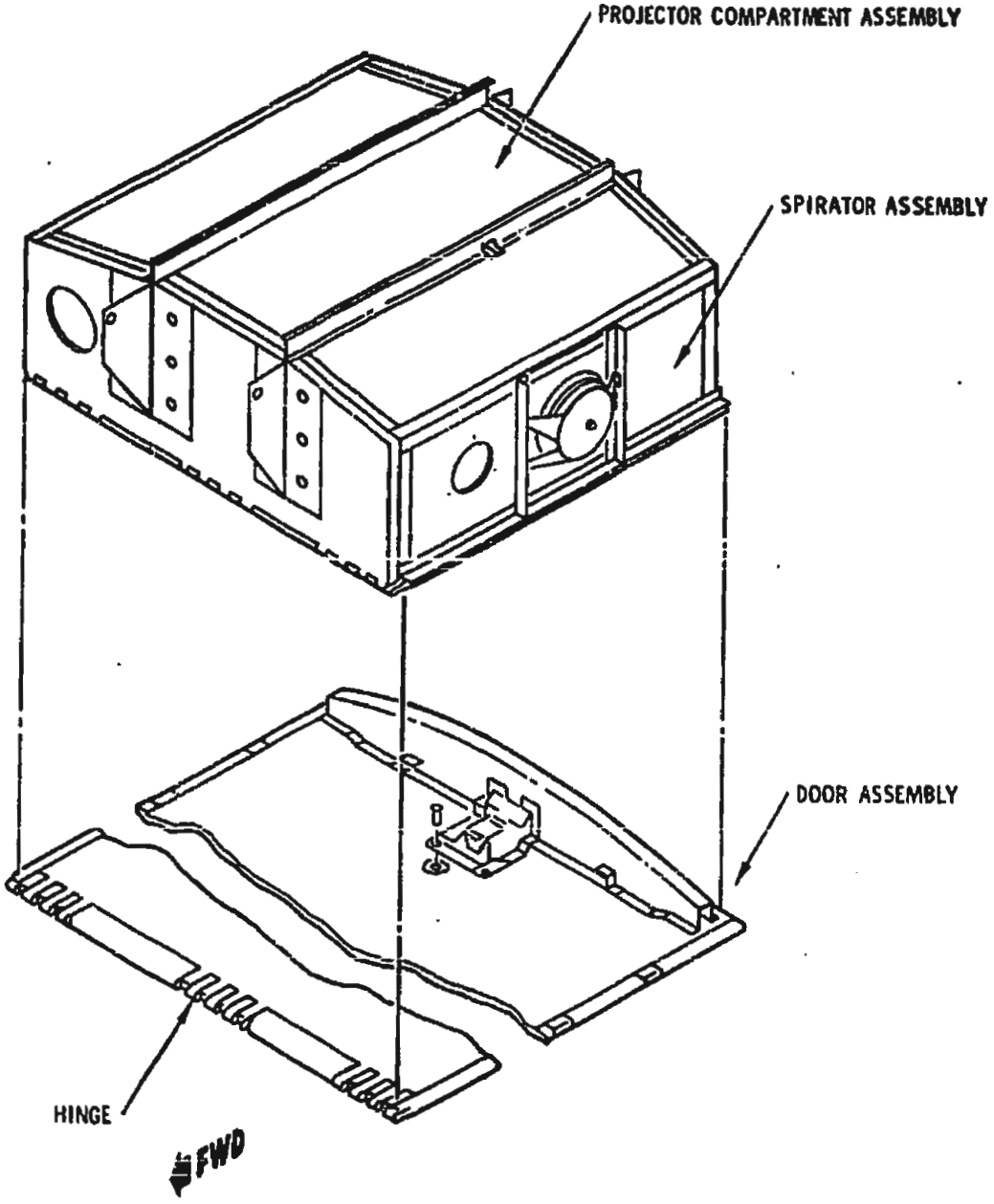
CR
CR

Zone 'C' Projector
Figure 3

R EFFECTIVITY: ALL
R
007R



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CR
CR

Projector Compartment Assembly
Figure 4

R EFFECTIVITY: ALL
R
007B

C 2) is being projected. When the MOVIE switchlight is
C pressed on (and the first film is on) the mode relay circuit
C applies 28V dc to the MOVIE 1 indicator. The MOVIE 1
C indicator comes on. When the first film is completed, the
C condition is sensed by the reel take-up limit switch which
C in turn energize the mode relay circuit. The mode relay
C circuit removes 28V dc from the MOVIE 1 indicator and
C applies it to the MOVIE 2 indicator, which then comes on.

C 3. Movie Projector Manual Crank

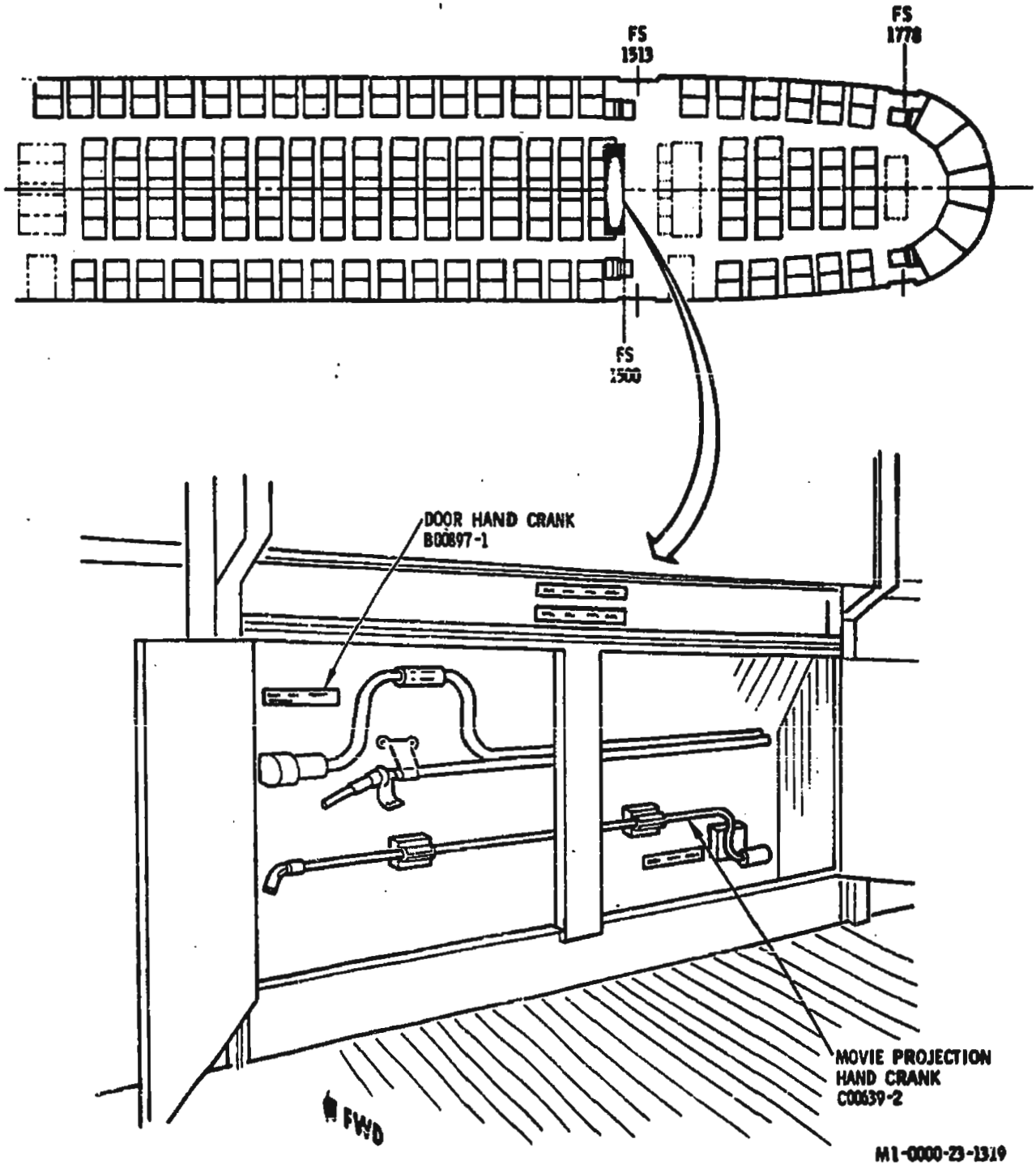
C A. Movie projectors are normally lowered from the ceiling
C electrically for service. In the event of electrical
C failure, the projector may be manually raised to the stowed
C position using a manual crank. The crank, Mfg. P/N C00639-2
C is stowed in the aft service center closet below the
C passenger door crank. The crank is held in place by spring
C clips and should be properly stowed after use. Ref. Fig. 5.

C B. The manual drive fitting is located on the aft, left corner
C of the elevator housing. Access may be gained by opening
C the hinged periscope cover panel which has a spring latch.
C The manual drive fitting and direction of rotation is
C placarded on the drive fitting access hole.

C C. The projector must be in the up and locked position for
C takecff and landing. To manually lower the projector, the
C two up-locks must first be manually released or damage to
C the elevator drive system may result. When manually
C releasing the two up-locks, be prepared to support and
C gently lower the projector assembly (approx. 100 pounds) in
C the event there is slack in the support chain.

C 4. Blow-Down Ceiling Panel/Mirror Shroud

C The ceiling panel/mirror shrouds on the bottom of each
C projector are part of a series of blow-down panels in the
C ceiling. In the event of a sudden decompression in the
C cabin, the differential air pressure will push open the
C blow-down panels and allow the air pressure to equalize
C between the overhead and the cabin without damage to the
C ceiling. The spring latches holding up these doors must be
CR kept in normal working order. The blow-down panel in Zone C
CR is immediately aft of projector No. 1A.



CR
CR

Hand Crank Stowage
Figure 5

R
R
0078

EFFECTIVITY: ALL

PASSENGER VISUAL ENTERTAINMENT SYSTEM - FAULT ISOLATION

1. General

R The fault isolation diagram in this section can be used for
R fault isolation any time a fault is reported or suspected. The
R PREREQUISITES listed at the top of each fault isolation diagram
R must be satisfied prior to starting fault isolation. Uncommon
R abbreviations are defined on the using fault code diagram or
R schematic.

R If the flight crew reports a trouble using a fault code number
R the code number can be found in the Fault Isolation Reference
R Table in the Chapter 23 Fault Code Index. The index specifies
R the exact maintenance manual section, fault isolation diagram,
R and block number on the diagram where the fault isolation
R procedure should start. Schematics are included at the end of
R the section to supplement the fault isolation diagrams or as an
R aid in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed
R description of the Fault Isolation Reporting Method (FIRM) and
R use of fault isolation diagrams and schematics.

2. Fault Isolation/Identification

Table 101 is a list of all Passenger Visual Entertainment fault isolation diagrams.

Passenger Visual Entertainment System Fault Isolation Diagrams
Table 101

FIGURE	TITLE
101	Component Location Index
102	Passenger Visual Entertainment System - Locator Diagram
103	Visual Entertainment Problem
104	Projected Image Not Steady On Screen

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
"A" BUS NO. 2 – MOVIE PROJ NO. 1 – 2334-CB4	1	GALLEY LEFT CB PNL/D10	•
"B" BUS NO. 2 – MOVIE PROJ NO. 1 –2334-CB3	1	GALLEY LEFT CB PNL/D11	•
"C" BUS NO. 2 – MOVIE PROJ NO. 1 – 2334-CB2	1	GALLEY LEFT CB PNL/D12	•
GND SVCE BUS – MOVIE PROJ NO. 1 – 2334-CB1	1	GALLEY LEFT CB PNL/D18	•
"A" BUS NO. 3 – MOVIE PROJ NO. 1A-2334-CB9001	1	GALLEY LEFT CB PNL/D1	
"B" BUS NO. 3 – MOVIE PROJ NO. 1A-2334-CB9002	1	GALLEY LEFT CB PNL/D2	
"C" BUS NO. 3 – MOVIE PROJ NO. 1A-2334-CB9003	1	GALLEY LEFT CB PNL/D3	
GRND SRVC BUS – MOVIE PROJ NO. 1A-2334-CB9004	1	GALLEY LEFT CB PNL/D22	
"A" BUS NO. 2 – MOVIE PROJ NO. 2 – 2334-CB7	1	GALLEY LEFT CB PNL/D7	•
"B" BUS NO. 2 – MOVIE PROJ NO. 2 – 2334-CB8	1	GALLEY LEFT CB PNL/D8	•
"C" BUS NO. 2 – MOVIE PROJ NO. 2 – 2334-CB6	1	GALLEY LEFT CB PNL/D9	•
GND SRVC BUS – MOVIE PROJ NO. 2 – 2334-CB5	1	GALLEY LEFT CB PNL/D20	•
"A" BUS NO. 3 MOVIE PROJ NO. 3 – 2334-CB12	1	GALLEY LEFT CB PNL/D4	•
"B" BUS NO. 3 MOVIE PROJ NO. 3 – 2334-CB10	1	GALLEY LEFT CB PNL/D5	•
"C" BUS NO. 3 MOVIE PROJ NO. 3 – 2334-CB11	1	GALLEY LEFT CB PNL/D6	•
GND SVCE BUS – MOVIE PROJ NO. 3 – 2334-CB9	1	GALLEY LEFT CB PNL/D21	•

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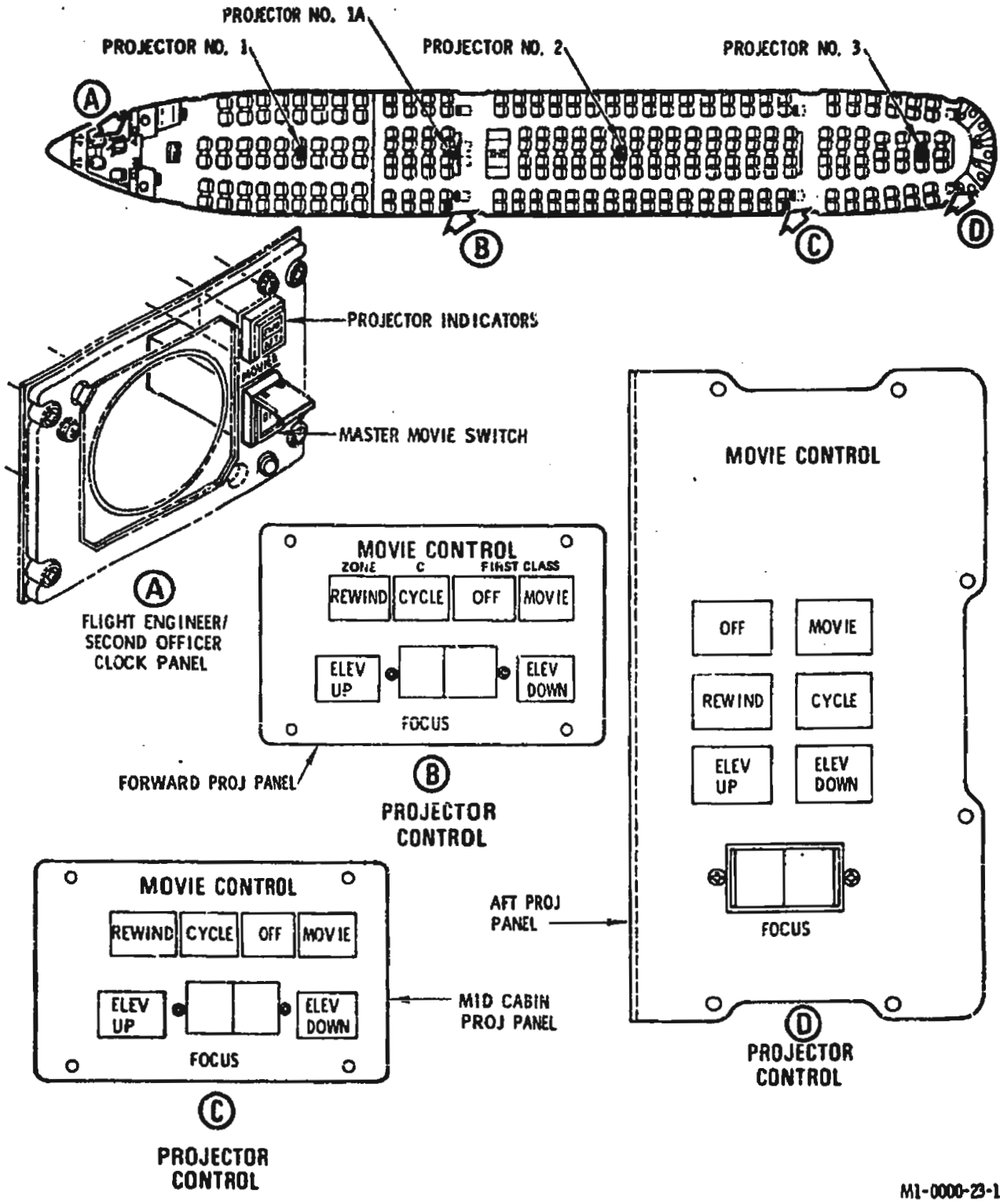
CR
CR

Component Locator Index
Figure 101



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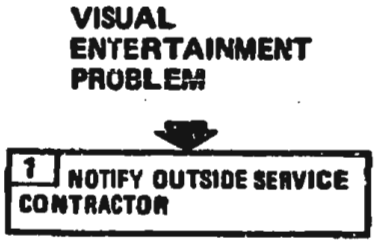
CR Entertainment Component Locator Diagram
CR Figure 102

EFFECTIVITY: ALL

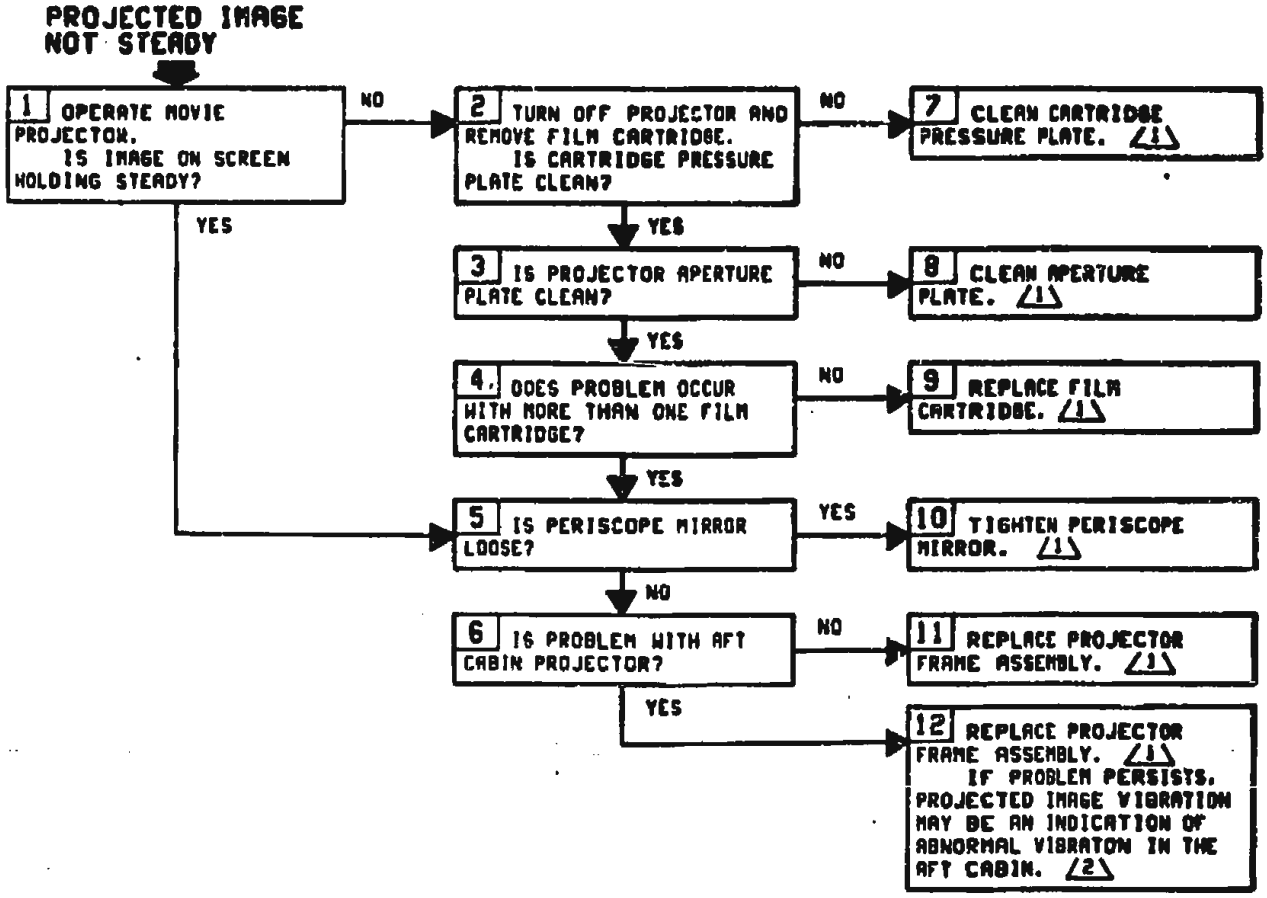
001B



Visual Entertainment Problem
Figure 103

EFFECTIVITY: ALL

PREREQUISITES
ELECTRICAL POWER (MM24-00-001)
CB'S IN: AS APPLICABLE, GALLEY LEFT PNL D4 THRU D12 AND D19 THRU D21
ON FE/SO PNL: MASTER MOVIES OFF SWITCHLIGHT TO ON POSITION
FILM CARTRIDGE INSTALLED IN PROJECTOR


PROJECTED IMAGE NOT STEADY
1 OPERATE MOVIE PROJECTOR. IS IMAGE ON SCREEN HOLDING STEADY?
NO
2 TURN OFF PROJECTOR AND REMOVE FILM CARTRIDGE. IS CARTRIDGE PRESSURE PLATE CLEAN?
NO
7 CLEAN CARTRIDGE PRESSURE PLATE. /1\
YES
YES
3 IS PROJECTOR APERTURE PLATE CLEAN?
NO
8 CLEAN APERTURE PLATE. /1\
YES
4 DOES PROBLEM OCCUR WITH MORE THAN ONE FILM CARTRIDGE?
NO
9 REPLACE FILM CARTRIDGE. /1\
YES
5 IS PERISCOPE MIRROR LOOSE?
YES
10 TIGHTEN PERISCOPE MIRROR. /1\
NO
6 IS PROBLEM WITH AFT CABIN PROJECTOR?
NO
11 REPLACE PROJECTOR FRAME ASSEMBLY. /1\
YES
12 REPLACE PROJECTOR FRAME ASSEMBLY. /1\ IF PROBLEM PERSISTS, PROJECTED IMAGE VIBRATION MAY BE AN INDICATION OF ABNORMAL VIBRATON IN THE AFT CABIN. /2\

NOTE

/1\ NOTIFY OUTSIDE SERVICE CONTRACTOR.

/2\ FOR TROUBLESHOOTING ABNORMAL VIBRATION AND/OR NOISES IN AFT CABIN, REFER TO MM ATA 71-91-00, FAULT ISOLATION.

M1-0000-23-1403

R Projected Image Not Steady On Screen
R Figure 104

R EFFECTIVITY: ALL
R
0018

C PASSENGER VISUAL ENTERTAINMENT SYSTEM - ADJUSTMENT AND TEST

C 1. Referenced Procedures

C 23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

C 24-41-00 External Power/Ground Service System - Maintenance Practices

C 33-27-00 Lavatory Lighting - Adjustment and Test

C 2. Adjustment/Test

C A. Operational Test

C (1) Turn on electrical power (Ref. 24-41-00).

C (2) On galley left circuit breaker panel, zone 130, verify
CR that circuit breakers MOVIE PROJECTOR 1, 1A, 2, 3 are
C closed.

C (3) On the Flight Engineer/Second Officers clock panel,
C verify that the MOVIES switchlight is not in the OFF
C position.

C NOTE: Perform the following Steps (4) through (12), in
C turn, for each of the three movie control
C panels. MOVIE CONTROL panels are located as
C follows:

C Control panel No. 1 (first class area)	Fwd of No. 2 LH passenger door
C Control panel No. 2 (mid coach area)	Fwd of No. 3 LH passenger door
C Control panel No. 3 (aft coach area)	Left aft main coach attendant station

C (4) Place selected movie screen in position for operation.
C Install film in projector.

C (5) On selected MOVIE CONTROL panel depress MOVIE
C switchlight. Verify that movie image appears on
C screen, and that MOVIE indicator comes on.

C (6) On Flight Engineer/Second Officers clock panel, verify
C that FWD or AFT indicator, as applicable, comes on.

CR C C C C C (7) When FIRST CLASS MOVIE switchlight on control panel No. 1 is on, verify that the two forward lavatory occupied signs do not come on when lavatory doors are closed (Ref. 33-27-00). When MOVIE switchlight on control panels NO. 2 and 3 (coach area) is on, the forward lavatory occupied signs are not affected.

C C (8) Verify reception of movie audio by listening to passenger seat headsets (Ref. 23-33-00).

C C C (9) Depress OFF switchlight. Verify that projector stops and that all MOVIE CONTROL panel indicators go off, except OFF switchlight.

C C NOTE: The OFF switchlight on the MOVIE CONTROL panel comes on (blue) in the off position.

C C CR CR (10) Depress ELEV DOWN switchlight and check that the elevator lowers into position for servicing. Check that the switch illuminates (Not applicable for projector 1A).

C (11) Removes film from projector if installed only for test.

C C CR CR (12) Depress ELEV UP switchlight and check that the elevator raises and stows in the full up position. Check that the switch illuminates (Not applicable for projector 1A).

C (13) Turn off electrical power (Ref. 24-41-00).

BOARDING MUSIC SYSTEM - DESCRIPTION AND OPERATION

1. General

The boarding music system provides monaural sound entertainment in the cabin for the passengers during boarding and deplaning periods, or in flight. The system is capable of delivering four
R hours of continuous uninterrupted programming. The boarding
R music and prerecorded announcement system has a PA override feature in which the PA system overrides all other prerecorded announcements and music. The system (Ref. Fig. 1) consists of a boarding music tape reproducer located in the mid electrical service center, left electrical equipment rack, zone 137; a remote volume control, and a remote ON-OFF switch located on the left forward attendant control panel, zone 221.

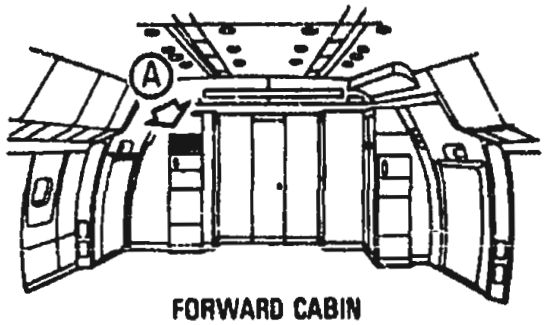
2. Operation

The boarding music tape reproducer (Ref. Fig. 2) receives 115V ac, 400 Hz operating power from the passenger service bus, 2L, phase C, through the AUDIO ENTERTAINMENT - TAPE RPDR circuit
R breaker on Galley Left circuit breaker panel,(8E).

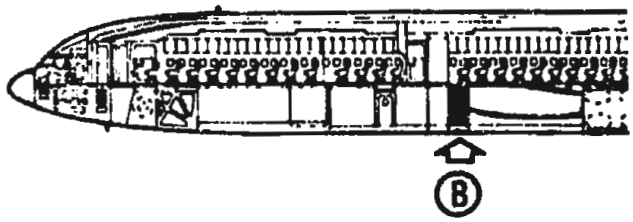
The tape reproducer accommodates four tape magazines, consisting of three 4-track, continuous-loop passenger entertainment magazines (Ref. 23-33-00) and one 4-track, continuous-loop boarding music magazine. The boarding music magazine is inserted in slot No. 3. The system is energized when power is connected to the aircraft buses, the system circuit breakers are closed, and the TAPE REPRODUCER-ON-OFF switchlight is depressed to "AUDIO ON". With the system energized, boarding music can be turned on by selecting program tracks 1, 2, 3, or 4 on the CHANNEL selector located between the audio "ON" switchlight and the boarding music VOLUME control on the left forward attendants panel.

The boarding music audio output of the tape reproducer is fed to input 4 of passenger address (PA) amplifier No. 1 (Ref. 23-31-00). The dual installation circuit is enabled so that the amplifiers operate in master-slave. If no PA microphones are keyed, PA amplifier No. 1 amplifies the boarding music audio to drive the forward cabin PA speakers. The dual installation output of PA amplifier No. 1 is fed to the dual installation input of PA amplifier No. 2, where it is amplified to drive the aft cabin PA speakers.

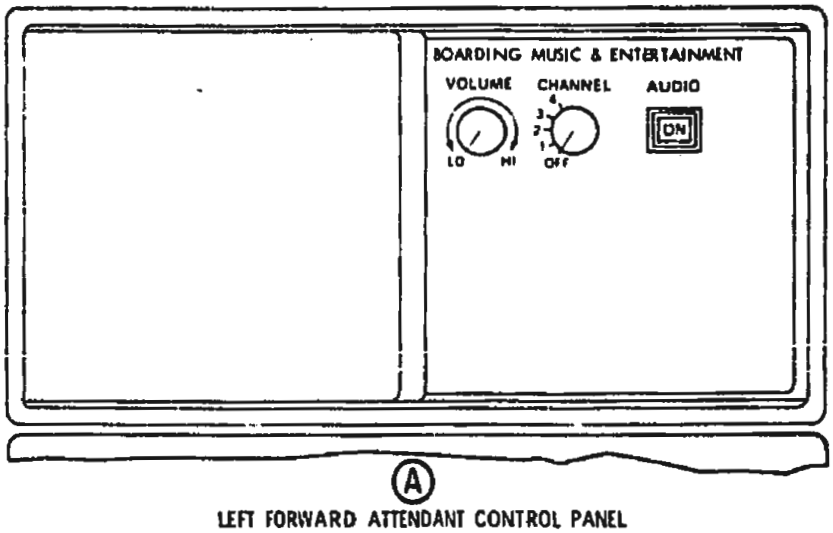
R The BOARDING MUSIC VOLUME control located next to the CHANNEL
R selector allows boarding music loudness adjustment by remotely controlling the tape reproducer preamplifier audio output level.



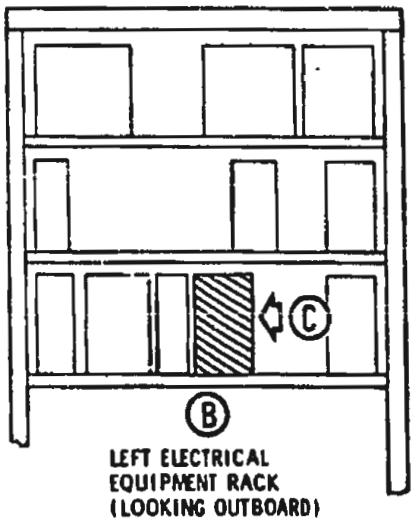
FORWARD CABIN
ZONE 221



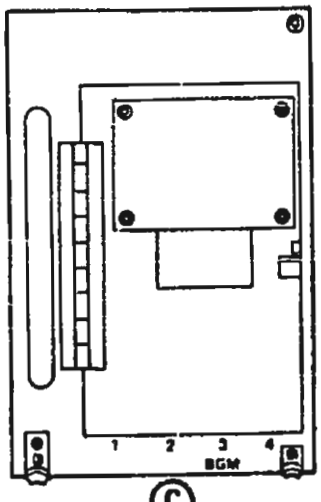
MID ELECTRICAL SERVICE CENTER
ZONE 137



LEFT FORWARD ATTENDANT CONTROL PANEL



LEFT ELECTRICAL
EQUIPMENT RACK
(LOOKING OUTBOARD)



TAPE REPRODUCER

Boarding Music System
Figure 1

3. Tape Reproducer

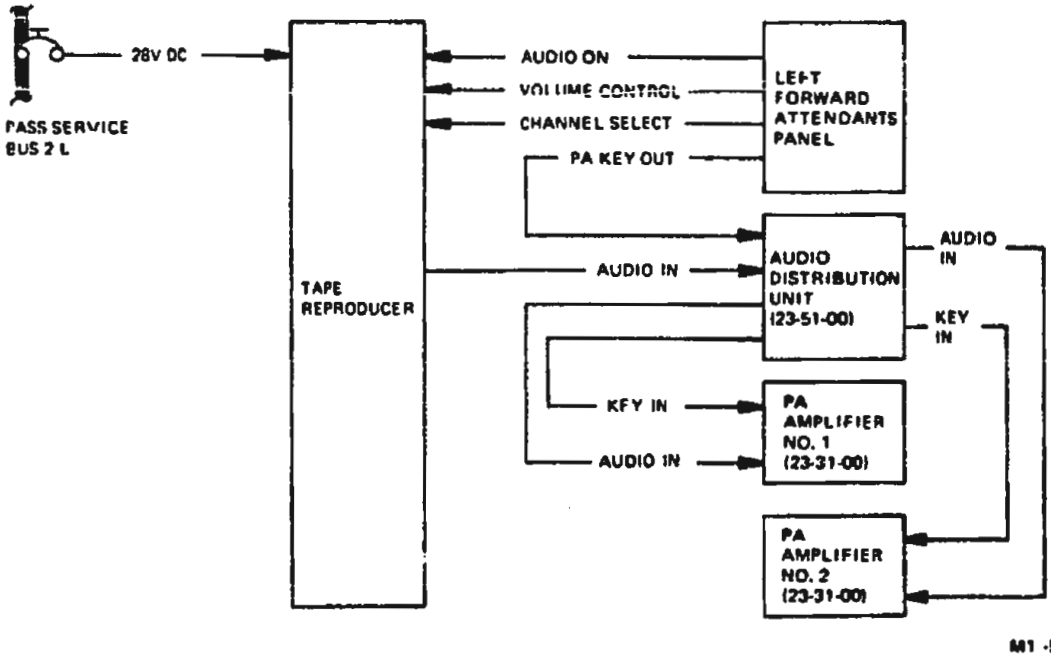
A. Description

R The audio tape reproducer is a monaural music tape reproducer. It is designed to provide high fidelity music entertainment providing up to sixteen monaural channels of prerecorded music to the multiplexed entertainment system (23-33-00) and the passenger address (PA) system (23-31-00) for boarding music. The tape reproducer will accommodate 4 magazines, each containing a cassette of prerecorded tape. The boarding music magazine is installed in slot No. 3 and the system is configured to provide 4 tracks of monaural music.

CR The tape reproducer is shipped without tape magazines
CR installed.

The tape reproducer cassettes are loaded with 1/4 inch magnetic tape in a continuous-loop configuration. The tape transport speed is 1 7/8 inches (4.75 cm) per second.

The tape reproducer is housed in a 1/2 ATR short case, and consists of the basic tape transport mechanism, preamplifier assemblies, and the magazines and cassettes. The magazines are loaded through a door in the front panel of the tape



Boarding Music System Block Diagram
Figure 2

R reproducer, the magazine slot positions are 1 through 4 from left to right.

B. Operation

During operation, a magazine containing the prerecorded tape cassette is inserted into the tape reproducer in any one of four slots. The boarding music magazine is inserted in slot No. 3. A single capstan motor drives a common capstan shaft which engages the pinch roller on each magazine as they are inserted into their respective slots.

The playback heads are located in the preamplifier assemblies which are contained in slots 1 through 4. Each preamplifier is connected to one of the tracks on the playback head. One preamplifier assembly is capable of reproducing two stereo, or four monaural channels depending on external wiring and the prerecorded program tape. The function of the preamplifier is to amplify the output of the tape playback head to a level compatible with the PA system. Equalization is employed in the preamplifier to compensate for frequency characteristics of the playback head and the recording process. The resultant output is a flat frequency response over the audio frequency spectrumEach preamplifier output stage is transformer coupled to provide a floating output. The boarding music system is configured to manually select four programs from the CHANNEL selector located on the left forward attendants panel.

All magazine assemblies (complete with cassettes) are completely interchangeable throughout all four magazine slots within the same transport. Alignment of the magazines and preamplifier assemblies in the reproducer housing is accomplished by two precision dowel pins in each slot. These dowel pins extend through the wall between the magazine and preamplifiers. The rear part of the dowel pin aligns the preamplifier, while the front part of the dowel pin is extra long to pre-guide the magazine into proper position and then to firmly align the magazine when it is seated. The magazine alignment to the magnetic heads is, therefore, held very accurately ensuring reliable interchangeability between magazines and preamplifiers.

The output level of the boarding music channel is controlled by a remote volume control located on the left forward attendants panel.

BOARDING MUSIC SYSTEM - FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number
R the code can be found in the Fault Isolation Reference Table in
R the Chapter 23 Fault Code Index. The index specifies the exact
R maintenance manual section, fault isolation diagram, and block
R number on the diagram where the fault isolation procedure should
R start. Schematics are included at the end of the section to
R supplement the fault isolation diagrams or as an aid in
R isolating a problem not covered on the diagrams. Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

The boarding music system is interfaced with the public adderss (PA) system with PA announcements assigned priority over boarding music. Faults in this system can usually be isolated to tape reproducer, volume pot on control panel, or stuck PA microphone key.

Table 101 lists the component location, fault isolation, and system schematic diagrams in this section.

TABLE 101

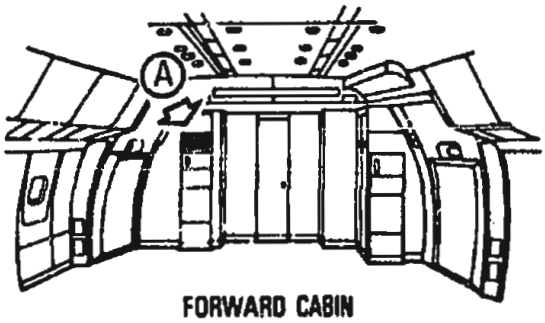
FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
SCHEM 1	Boarding Music System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
PASS SERV BUS – AUDIO ENT. TAPE RPDR 2336-CB1	1	GALLEY LEFT CB PANEL E8	*
REPRODUCER – TAPE	1	MISC LF RACK/127MZ	23-35-01
MAGAZINE – TAPE REPRODUCER	1	IN TAPE REPRODUCER	23-35-03

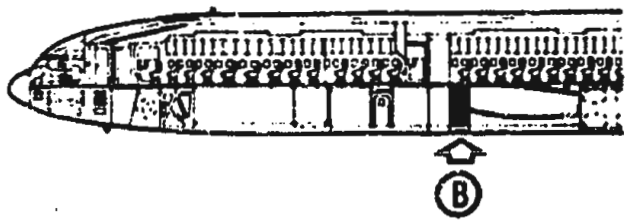
*SEE WM EQUIPMENT LIST

M1-0000-23-3540

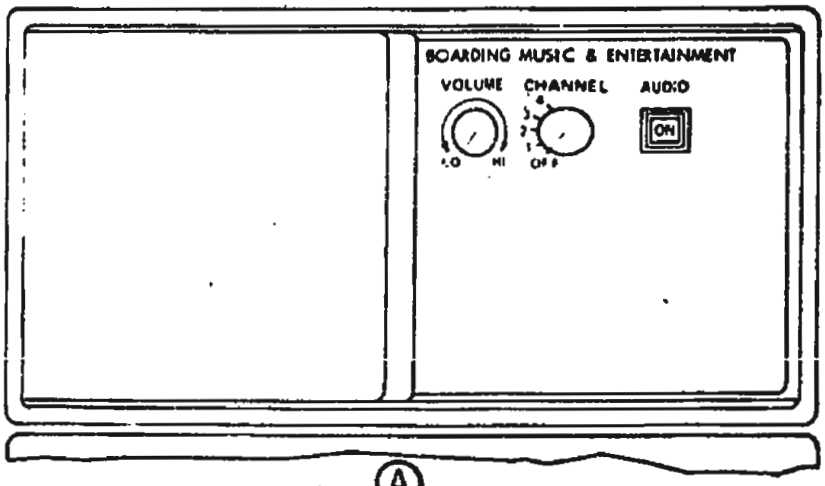
R Component Location Index
R Figure 101



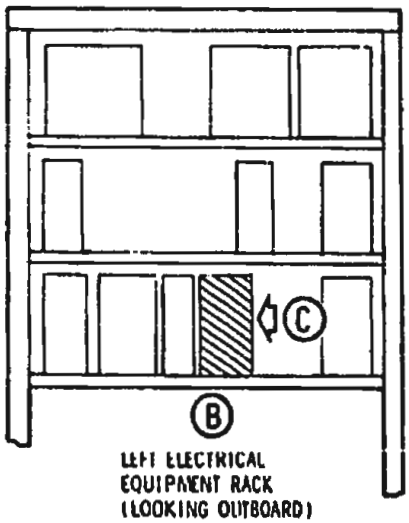
FORWARD CABIN
ZONE 221



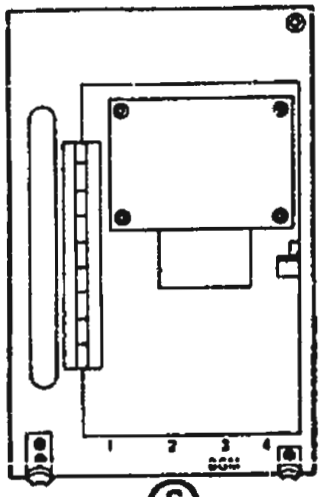
MID ELECTRICAL SERVICE CENTER
ZONE 137



LEFT FORWARD ATTENDANT CONTROL PANEL



LEFT ELECTRICAL
EQUIPMENT RACK
(LOOKING OUTBOARD)



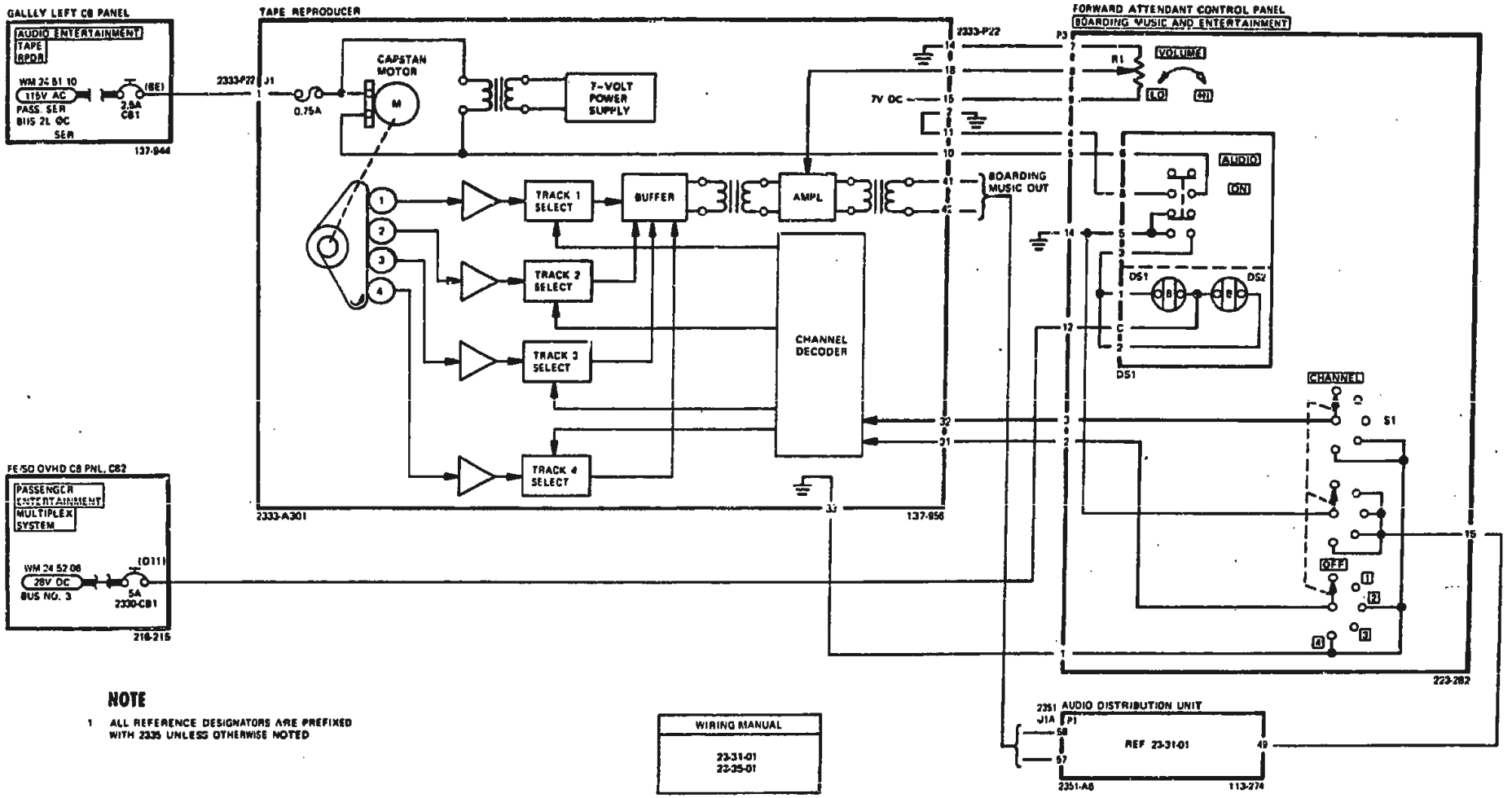
TAPE REPRODUCER

R
R

Component Locator Diagram
Figure 102

EFFECTIVITY: ALL

001B



NOTE

1 ALL REFERENCE DESIGNATORS ARE PREFIXED WITH 2335 UNLESS OTHERWISE NOTED

WIRING MANUAL
23-31-01 23-35-01

G 2777
EM1-0001-23 383

R
R Boarding Music System Schematic
SCHEM 1

R EFFECTIVITY: ALL
R
001B

BOARDING MUSIC SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-33-00	Passenger Audio Entertainment and Service System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Verify that the passenger address (Ref. 23-31-00), and passenger audio entertainment and service (Ref. 23-33-00) systems are turned on.

(2) Turn on electrical power (Ref. 24-00-00).

(3) On galley left circuit breaker panel, zone 131, verify that circuit breaker AUDIO ENTERTAINMENT - TAPE RPDR is closed.

(4) In mid electrical service center at left equipment rack, verify that a boarding music or test tape cassette is installed in slot No. 3 of the TAPE REPRODUCER PASS. ENTERTAINMENT & BOARDING MUSIC.

(5) In flight station on pilots overhead circuit breaker panel, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - NO. 1 (A15) and NO. 2 (A16) are closed.

(6) In passenger compartment on left forward attendant control panel, position BOARDING MUSIC & ENTERTAINMENT controls as follows:

(a) AUDIO ON switchlight depressed

(b) CHANNEL selector to 1, 2, 3, or 4

(c) VOLUME control midway between LO and HI

(7) Verify that AUDIO ON light comes on, and boarding music or test tape audio can be heard over passenger address system speakers throughout the passenger compartment.

R (8) Release AUDIO ON switchlight.

R (9) Turn off electrical power (Ref. 24-00-00).

TAPE REPRODUCER - MAINTENANCE PRACTICES

1. Equipment and Materials

Flashlight

Noncombustible cleaning agent such as Freon

Lint free cloth, or applicators

2. Maintenance Practices

R (1) Open circuit breaker TAPE RPDR, 9E on the Galley Left
R circuit breaker Panel.

(2) Remove tape magazines.

R (3) Using the lint free cloth, and/or applicators moistened with cleaning agent, gently clean the head surfaces. Use flashlight to illuminate heads, if necessary. Repeat cleaning process until no discoloration of the cloth or applicator is noted.

CAUTION: DO NOT USE HARSH DETERGENTS OR SOLVENTS TO CLEAN HEADS. HANDLE WITH EXTREME CARE OR DAMAGE MAY RESULT.

(4) Allow head surfaces to dry thoroughly.

(5) Install tape magazines.

TAPE REPRODUCER - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-33-00	Passenger Audio Entertainment and Service System (PSS/PES) - Adjustment and Test
23-35-00	Boarding Music - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breaker AUDIO ENTERTAINMENT - TAPE RPDR (E8). R

(2) In mid electrical service center (MESC), zone 137, locate tape reproducer on left equipment rack (Ref. Fig. 401).

(3) Loosen thumbscrews and drop clear of tape reproducer retaining brackets.

(4) Pull tape reproducer forward until guide pins and connector disengage, then remove tape reproducer.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Position and slide tape reproducer into rack until alignment pins and connector mate.

(3) Lift thumbscrews to engage tape reproducer retaining brackets and tighten thumbscrews.

3. Test

A. After replacement of Tape Reproducer, perform the following:

(1) Install test or entertainment tape cassettes in all four tape reproducer slots. Note what is recorded on each cassette.

(2) In MESC at left equipment rack, locate main multiplexer and open STEREO SWITCHES panel. Note that stereo
R switches are positioned correctly. Close panel.

(3) Remove tags and close circuit breakers opened in Step 2A(1).

(4) Turn on electrical power (Ref. 24-00-00).

(5) Turn on passenger entertainment system (Ref. 23-33-00).

At MULTIPLEXER PSS/PES TEST panel, verify that service and entertainment test selector switches are both in NORM position.

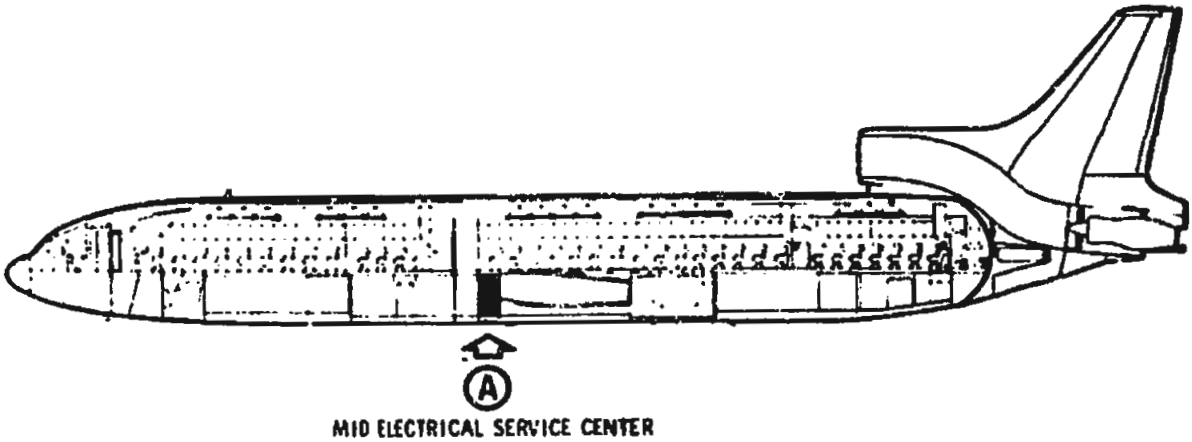
(6) At any passenger seat, verify that tape reproducer audio is loud and clear, and on correct entertainment channels [Ref. Step (5) and 23-33-00, Table 501].

(7) Turn on boarding music (Ref. 23-35-00), and passenger address system (Ref. 23-31-00).

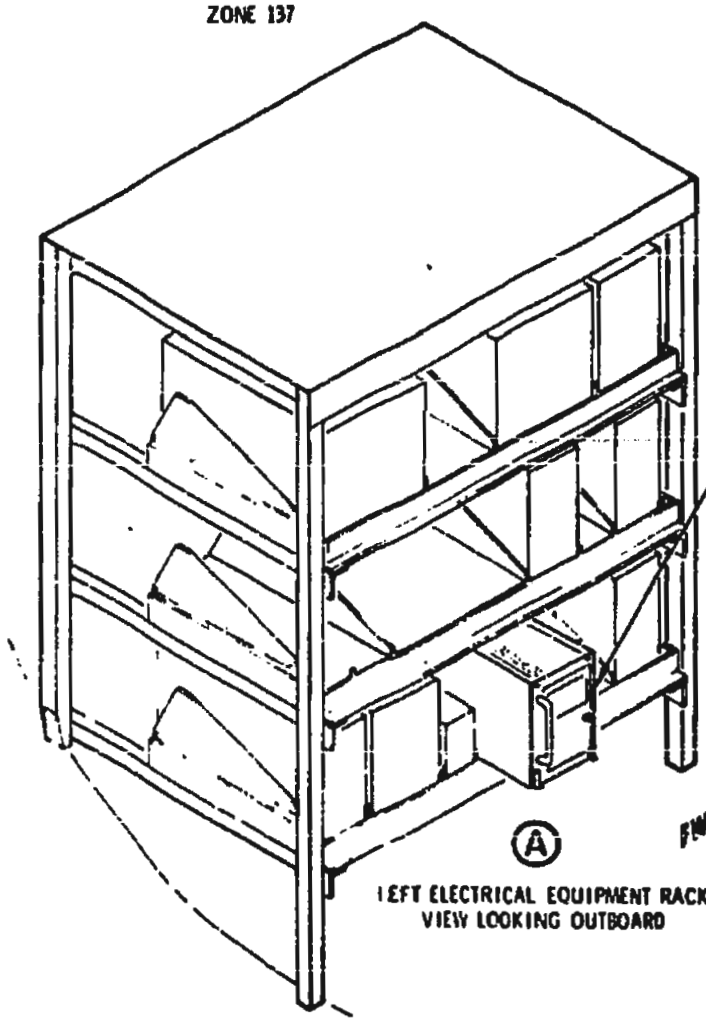
Verify that boarding music is loud and clear on passenger address audio speakers.

(8) Turn off passenger address system (Ref. 23-31-00), passenger audio entertainment system (Ref. 23-33-00), boarding music system (Ref. 23-35-00), and electrical power (Ref. 24-00-00).

(9) If test tapes were installed in tape reproducer, replace with entertainment tapes.



MID ELECTRICAL SERVICE CENTER
ZONE 137



LEFT ELECTRICAL EQUIPMENT RACK
VIEW LOOKING OUTBOARD

HH 8760
M1-5000-23-269

R R Tape Reproducer - Removal and Installation
Figure 401

C TAPE REPRODUCER - HEAD AND CAPSTAN CLEANING

C 1. General

C A. The following paragraphs provide a procedure for cleaning the heads and capstan shaft in the music system tape reproducer.

C B. This procedure assumes that power is available to the aircraft busses, and that all switches and circuit breakers associated with the passenger entertainment system are closed and on. The circuit breakers involved are as follows:

C (1) PASSENGER ENTERTAINMENT - MULTIPLEX SYSTEM - located on the Flight Engineer's overhead circuit breaker panel CB2, zone 215.

C (2) POWER SUPPLY - MULTIPLEXED PASS SERVICE - located on the galley right circuit breaker panel, zone 130.

C (3) AUDIO ENTERTAINMENT - TAPE REPRODUCER and AUDIO ENTERTAINMENT - SUB MULTIPLEXER FWD, MID-AFT, and AFT. Four circuit breakers located on the galley left circuit breaker panel, zone 130.

C 2. Equipment and Materials

C A. A supply of clean cotton swabs or "Q" tip applicators (or equivalent)

CR B. Denatured alcohol (TWA Stk. Nbr. 50-0479) or Isopropyl CR alcohol (TWA Stk. Nbr. 50-0143)

C C. Lint free cloth

C D. Stethoscope headset

C E. Flashlight

C 3. Cleaning Procedure

C A. At the left forward cabin attendant's BOARDING MUSIC & ENTERTAINMENT control panel, depress the AUDIO switchlight to turn the tape reproducer OFF.

C B. In the mid electrical service center, zone 137, locate the
C tape reproducer on the left equipment rack, lower shelf.
C (Ref. Fig. 401).

C C. Remove the tape magazines, recording the position of each
C for reference at reinstallation.

C D. Using a cotton swab or applicator moistened with denatured
C alcohol, gently clean the tape head faces. Continue the
C cleaning process, using fresh materials as required, until
C no discoloration of the applicator is noted. Use the
C flashlight to illuminate the work area.

C E. At the left forward attendant's panel, press the AUDIO
C switch to turn ON the tape reproducer.

C F. At the tape reproducer, assure the capstan shaft is turning.
CR Using the lint-free cloth moistened with denatured or
CR isopropyl alcohol, cautiously clean the rotating capstan
C shaft. Hold the cloth against the shaft and wipe from end
C to end until no discoloration of the cloth is noted. Change
C the cloth wiping area frequently, and use the flashlight to
C illuminate the work area.

C G. At the left forward attendant's panel, depress the AUDIO
C switch to turn OFF the tape reproducer.

C H. At the tape reproducer, using a dry lint-free cloth, wipe
C the capstan and head area to absorb all remaining cleaning
C by-products.

C I. Reinstall the program tapes in the positions from which they
C were removed.

C J. Close the magazine compartment door and check that the tape
C reproducer is securely fastened in the equipment rack.

C 4. <u>System Operational Test</u>

C A. At the left forward attendant's panel, depress the AUDIO
C switch to ON. Operate the BOARDING MUSIC selector switch
C from OFF to position 1. Music should be heard from the
C cabin speakers. Adjust the boarding music volume control
C for a comfortable listening level.

C B. Check that channels 2, 3, and 4 of the boarding music
C selector switch are operative by monitoring the cabin music
C at each position of the switch.

C C. Position the BOARDING MUSIC switch to OFF.

C D. At any cabin seat position, connect the stethoscope headset
C and establish that the audio programs are available at seat
C selector channels 2, 3, 4, 5, 6, 7, 8, 9, and 10. Channels
C 2 and 3 are stereo, and all others are monaural. Check for
C audio of good quality, without distortion or scratchiness.
C The level should be approximately equal in each ear.

C E. Remove the stethoscope headset, and press the AUDIO switch
C at the left forward attendant's panel to turn OFF the music
C system.

C F. Coordinate with others working on the aircraft, and turn OFF
C aircraft power if it is no longer required.

TAPE REPRODUCER MAGAZINE - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-33-00	Passenger Audio Entertainment and Service System (PSS/PES) - Adjustment and Test
23-35-00	Boarding Music System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breaker AUDIO ENTERTAINMENT TAPE RPDR (E8).

R (2) In mid electrical service center, zone 137, locate tape reproducer on shelf No. 3 of left equipment rack.

(3) Grasp door latch and squeeze to release from door catch, then pull door open (Ref. Fig. 401).

For magazine(s) to be removed, pull magazine latch past resistance of overcenter mechanism to open position.

(4) Remove magazine by pulling out on protruding knob on bottom of magazine.

Push magazine latch(es) past resistance of overcenter mechanism to closed position.

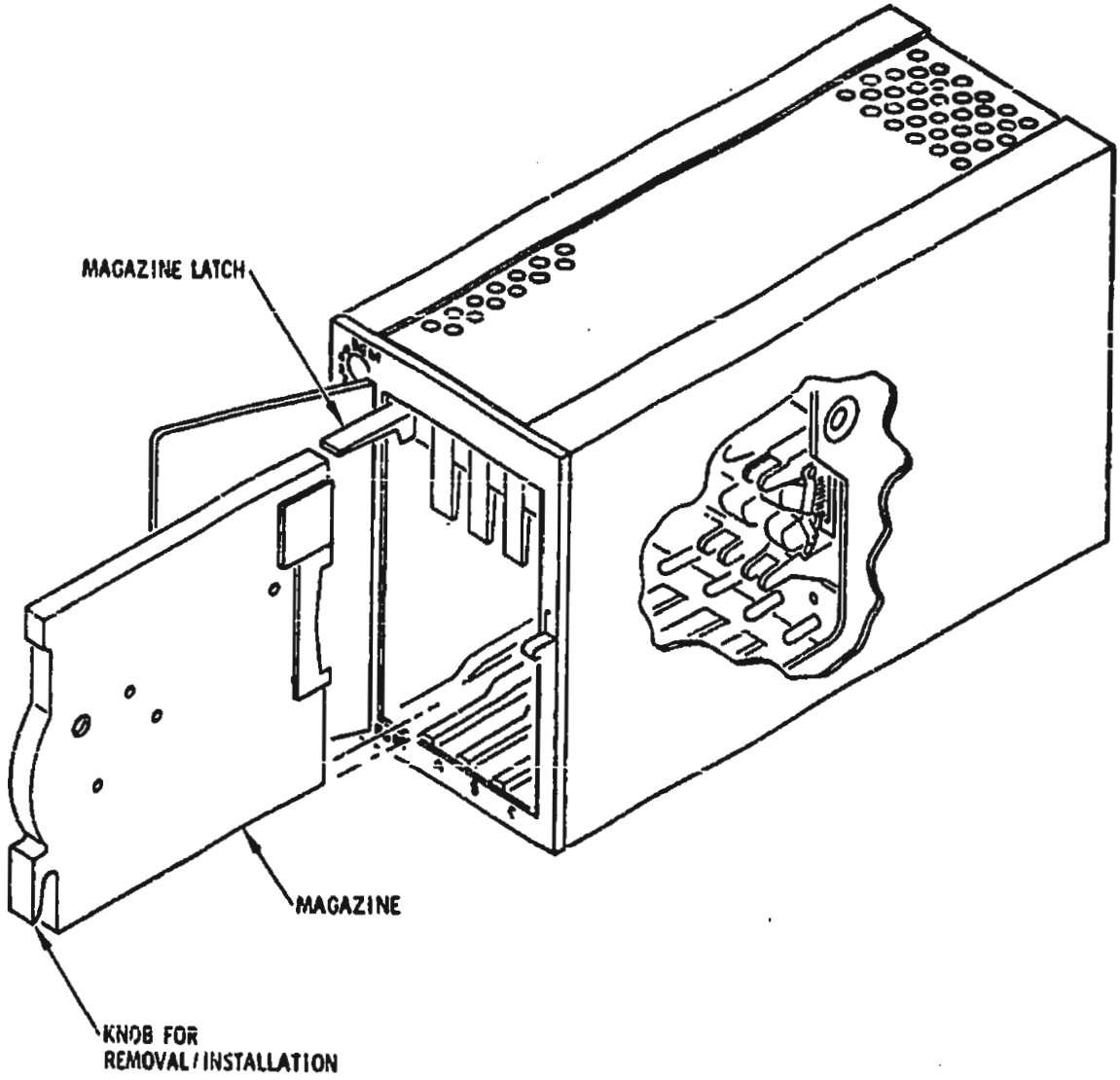
Push door closed.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) In mid electrical service center, zone 137, locate tape reproducer on shelf No. 2, left equipment rack.

(3) If door on tape reproducer is not open, grasp door latch and squeeze to release from door catch, then pull door open (Ref. Fig. 401).



MI-41800-23-1080

R Tape Reproducer Magazine - Removal and Installation
R Figure 401

R For magazine(s) to be installed, pull magazine latch
R past overcenter mechanism to open position.

(4) Align magazine with guide slots of tape reproducer main frame assembly. Push magazine back slowly until it
R engages guide pins, then press firmly to seat magazine
R as far back as possible.

R Push magazine latch(es) past resistance of overcenter
R mechanism to closed position.

R Push door closed.

(5) Remove tags and close circuit breakers opened in Step 2A(1).

3. Test

A. After Replacement of Any Magazine

(1) Turn on electrical power (Ref. 24-00-00).

(2) Turn on Passenger Address (PA) System (Ref. 23-31-00).

R R (3) At left forward attendants control panel, zone 223, engage system AUDIO - ON switchlight to ON.

(4) Select BOARDING MUSIC to ON and adjust VOLUME control as necessary. Verify the following:

Boarding music is loud and clear through all PA speakers

R R (5) Select BOARDING MUSIC - OFF and release AUDIO - ON switchlight.

(6) Turn off electrical power (Ref. 24-00-00).

C C # AUTOMATIC ANNOUNCEMENT SYSTEM DESCRIPTION AND OPERATION

C 1. General

C The auto-announce system provides selectable pre-recorded C announcements in the cabin for passengers during departure and C arrival, or in flight. The in flight portion is a pre-recorded C EMERGENCY OXYGEN announcement, recorded in ENGLISH and FRENCH. C This announcement would be provided automatically in the event C of a decompression. The system (Ref. Fig. 1) consists of an C auto-announce tape reproducer located in the forward electrical C service center, left hand rear electrical equipment rack, zone C 274; a remote auto-announce control unit, used in the selection C of pre-recorded announcements, is located on the left forward C attendants control panel at the L-1 door, zone 221. A program C card listing the available messages is located on the C auto-announce control panel.

C 2. Operation

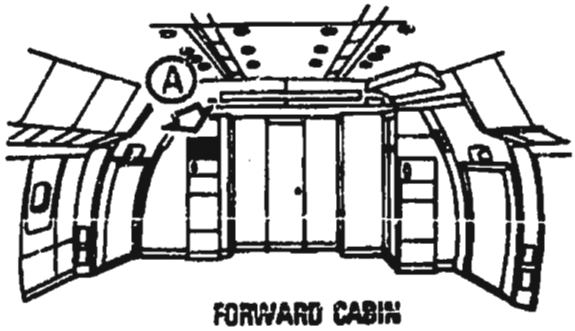
C The auto-announce tape reproducer (Ref. Fig. 2) receives 115V C AC, 400 Hz and 28V DC operating power from passenger service bus C No. 2, phase A (AC) and DC bus No. 2 (DC) through PASS. SERV C AUTO-ANNOUNCE-TAPE REPRODUCER circuit breakers. The tape C reproducer accommodates six tape cartridges, consisting of C four-tracks on each continuous loop auto-announce cartridge. C Tape cartridge No. 4 contains the EMERGENCY OXYGEN announcement. C With the system energized, announcements may be selected by C depressing message selection switches A-F, 1-4 on the C auto-announce control unit.

C The auto-announce audio output of the tape reproducer is fed to CR input 3 of passenger address (PA) amplifier No. 1 (Ref. CR 23-31-00). This will insure that the auto-announce audio out C will be amplified and drive both the forward cabin PA speakers C and the aft cabin PA speakers.

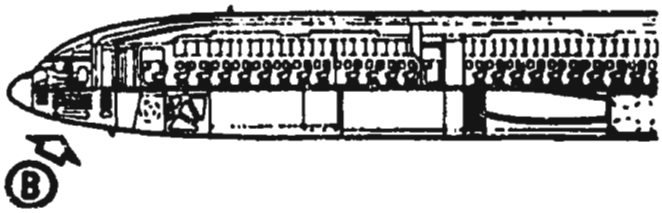
C The PA system operates with a priority system; auto-announce is C the second lowest priority. Pre-recorded announcements will C over ride boarding music but be overridden by all voice C announcements.

C 3. Tape Reproducer

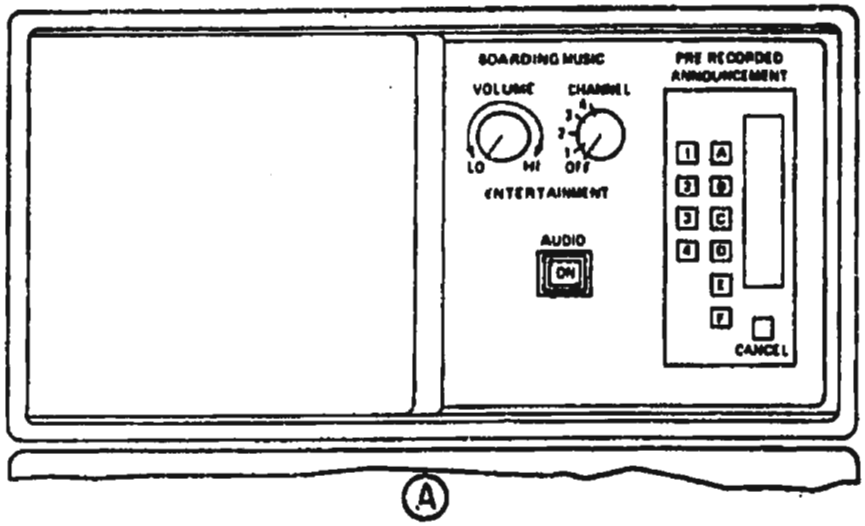
C A. Description



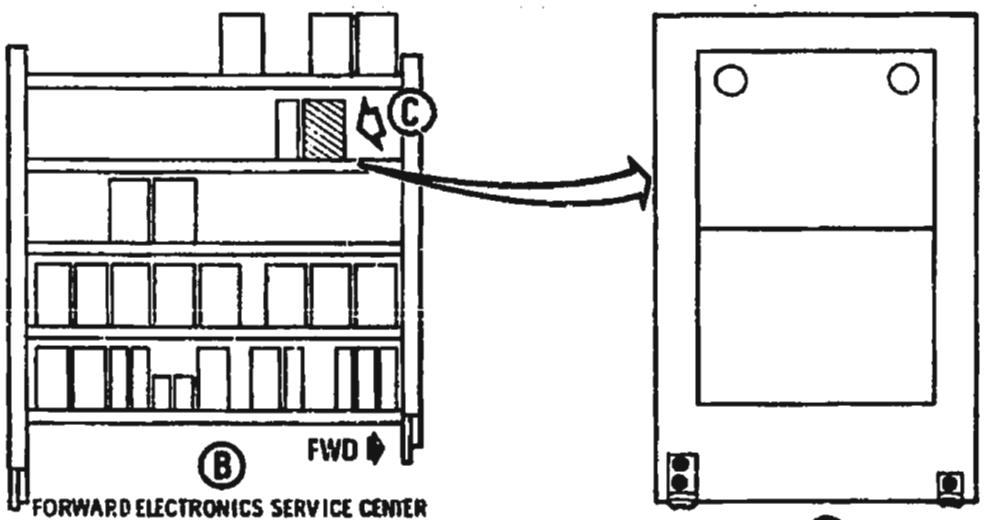
FORWARD CABIN
ZONE 221



FESC ELECTRICAL SERVICE CENTER
ZONE 113



LEFT FORWARD ATTENDANT'S CONTROL PANEL



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING OUTBOARD

TAPE REPRODUCER

MI-0001-23-1328

CR Automatic Announcement System Equipment and Location
CR Figure 1

EFFECTIVITY: 019, 020, 023-999

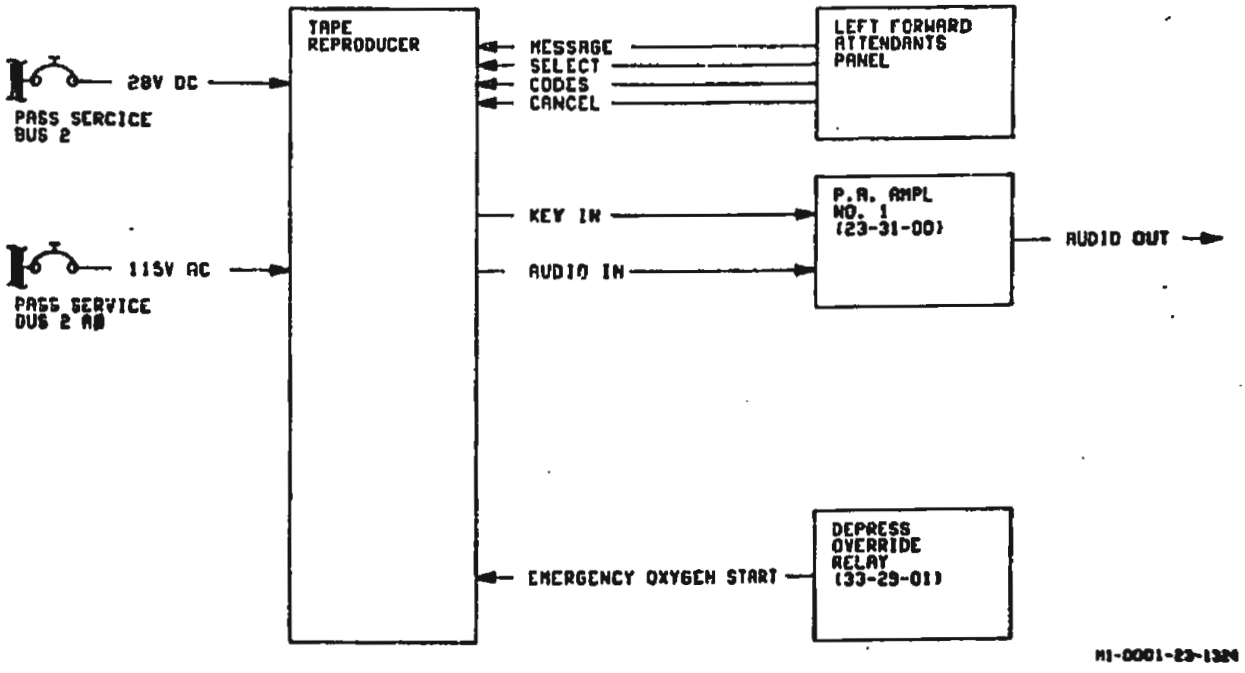
C The tape reproducer main assembly is a standard 1/2 ATR long
C case, and it houses the following main assemblies; the tray main
C assenblies, the mechanical chassis assembly, and the electronic
C chassis assembly. The tray main assemblies physically consist
C of the components that make up the receptacle tray for the
C cartridge to be inserted. These are essentially the spring and
C solenoid assemblies, rail assemblies, sound head and connector.
C The mechanical chassis assembly essentially contains the main
C mechanical and drive mechanisms such as flywheel, motor,
C bearings, solenoids and terminal board assemblies. The
C electronic assemblies contain all the message logic control
C assemblies, the message track audio assemblies and the message
C power assemblies.

C B. Operation

C (1) Initially, after aircraft power is applied, a pulse is
C generated by the system logic to check that all tape
C cartridges are wound to a starting position. After
C this check the unit returns to stand by.

C (2) Message Selection

C Messages are selected by depressing two coded
C pushbuttons on the control unit. These pushbuttons, a
C combination of a number and letter button, will



CR Automatic Announcement System Block Diagram
CR Figure 2

C illuminate upon selection. The cartridge selected is
C pulled into play position and the proper track head is
C switched into the audio amplifier. At the end of the
C message, regardless of the length of the message, the
C logic receives and END OF MESSAGE signal, which
C disconnects the head, opens the aircraft key line, and
C extinguishes the (track) number button. The cartridge
C continues to wind the tape to return it to its starting
C position. At this time, the cartridge memory logic and
C cartridge will return to stand by and the letter button
C light will go off. If no further message buttons are
C depressed, the unit will resume stand by condition.

C If it is desired to re-select a second message on the
C same cartridge, the cancel button must be depressed and
C the cartridge must be allowed to recycle to the start
C position. The second message may be selected as soon
C as the letter button light extinguishes. It cannot be
C selected while a cartridge light is on and the
C cartridge is winding.

C (3) Emergency Signal

C In the event an emergency signal is received by the
C unit (Ref. 33-29-01) either during the standby or
C message modes, the emergency signal will override the
C message and activate the emergency message. Activation
C of the emergency message is independent of manual
C control. A ground on the emergency message line will
C automatically override all other modes, and will repeat
C the emergency until the CANCEL button is depressed.

C 4. Control Unit

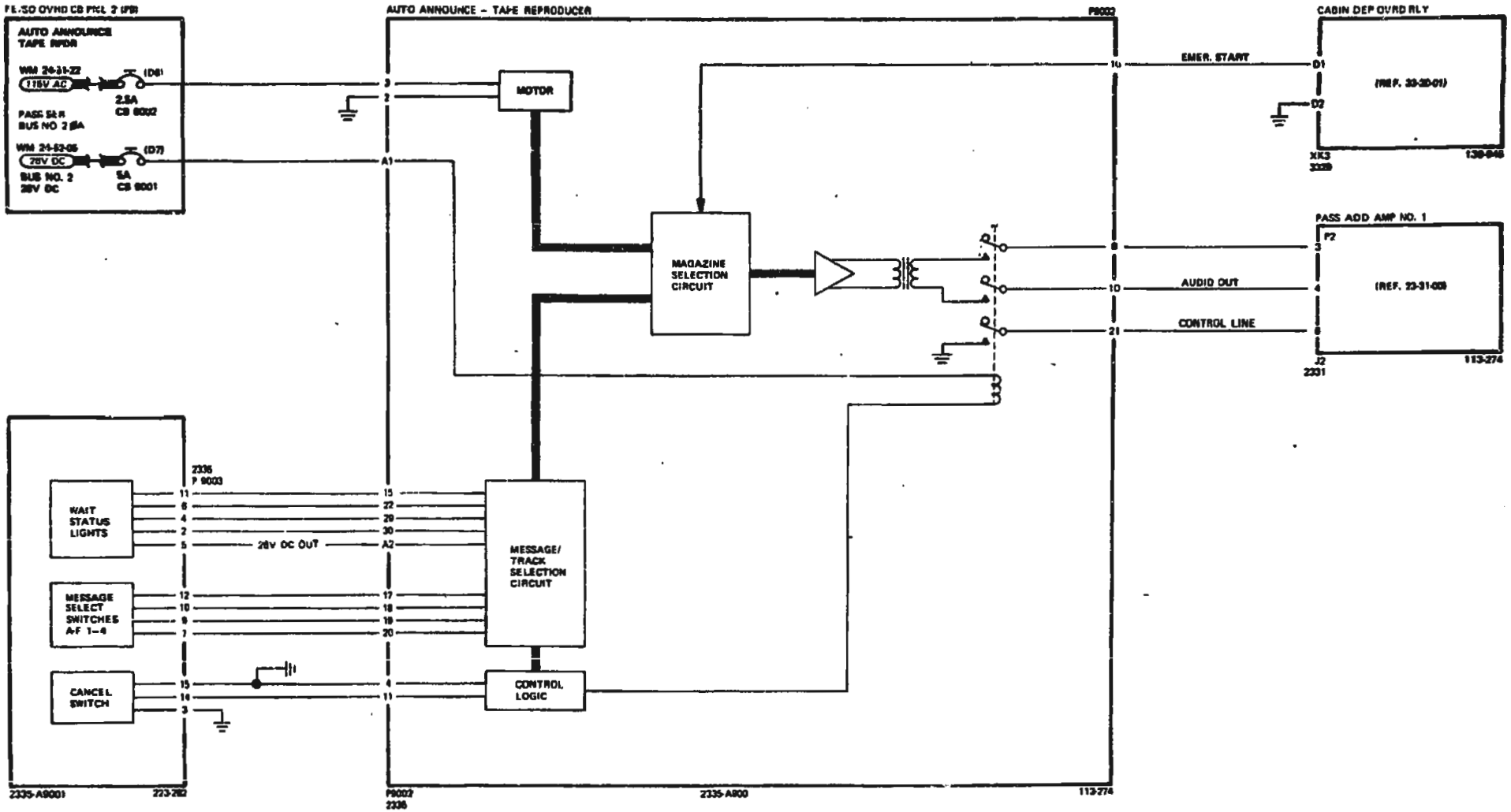
C A. Description

C The control unit assembly physically houses the electrical
C assembly containing the illuminated pushbutton switches, and
C the necessary electronic components that make up the
C selection control of the tape reproducer.

C AUTOMATIC ANNOUNCEMENT SYSTEM - FAULT ISOLATION

C 1. Fault Isolation/Identification

C SCHEM 1 is an automatic announcement system schematic which can
C be used for fault isolation.



C Automatic Announcement System Schematic
C SCHEM 1

R EFFECTIVITY: 019, 020, 023-999
R
0018

C AUTOMATIC ANNOUNCEMENT SYSTEM - ADJUSTMENT/TEST

C 1. Referenced Procedures

C 23-31-00 Passenger Address System - Adjustment and Test

C 23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

C 24-00-00 Electrical Power - Maintenance Practices

C 2. System Test

C A. Operational Test

C (1) Verify that the passenger address (Ref. 23-31-00) and passenger audio entertainment and service (Ref. 23-33-00) systems are turned on.

C (2) Turn on electrical power (Ref. 24-00-00).

C (3) On the FE/SO circuit breaker panel zone 210, verify that circuit breakers PRE-RECORD ANNOUNCEMENT AC - DC are closed.

C (4) On galley left circuit breaker panel, zone 131, verify that circuit breaker AUDIO ENTERTAINMENT - TAPE RECORDER RPDR is closed.

C (5) In mid electrical service center at the left equipment rack, verify that a boarding music or test tape cassette is installed in slot No. 3 of the TAPE REPRODUCER PASS. ENTERTAINMENT & BOARDING MUSIC unit.

C (6) In the flight station on pilot's overhead circuit breaker panel, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - PA - No. 1 (A15) and No. 2 (A16) are closed.

C (7) In passenger compartment on left forward attendant control panel, position BOARDING MUSIC & ENTERTAINMENT controls as follows:

C (a) AUDIO ON switchlight depressed

C (b) CHANNEL selector to 1, 2, 3, or 4

C (c) VOLUME control midway between LO and HI

C (8) Verify that AUDIO ON light comes on, and boarding music C or test tape audio can be heard over passenger address C system speakers throughout passenger compartment.

C (9) In passenger compartment on left forward attendant C control panel, PRE-RECORDED ANNOUNCEMENT, depress C switches A-1.

C (10) Verify that switches A-1 light and that ANNOUNCEMENT C overrides boarding music.

C (11) Depress CANCEL switch, verify boarding music returns.

C (12) When switchlights A-1 have been extinguished, depress C switches B-1, verify announcement overrides boarding C music.

C (13) Lift flight attendants handset; press PTT and talk into C handset at normal level. Verify that attendant C announcement overrides auto-announce.

C (14) When switchlights B-1 have been extinguished, release C AUDIO ON switchlight.

C (15) Turn off electrical power (Ref. 24-00-00).

C

TAPE REPRODUCER - REMOVAL AND INSTALLATION

C 1. Referenced Procedures

C 23-31-00 Passenger Address System - Adjustment and Test

C 23-33-00 Passenger Audio Entertainment and Service System - Adjustment and Test

C 23-37-00 Automatic Announcement - System Test

C 24-00-00 Electrical Power - Maintenance Practices

C 2. Tape Reproducer Removal/Installation

C A. Removal

C (1) On the FE/SO circuit breaker panel zone 210, open and tag circuit breakers PRE-RECORDED ANNOUNCEMENT AC and DC.

C (2) In the forward electrical service center (FESC) zone 274, locate tape reproducer on left hand rear equipment rack shelf No. 4 (Ref. Fig. 401).

C (3) Loosen rack hold downs and drop clear of tape reproducer retaining brackets.

C (4) Pull tape reproducer forward until guide pins and connector disengage, then remove tape reproducer.

C B. Installation

C (1) Verify circuit breakers opened in Step 2A(1) are open and tagged.

C (2) Position and slide tape reproducer into rack until alignment pins and connector mate.

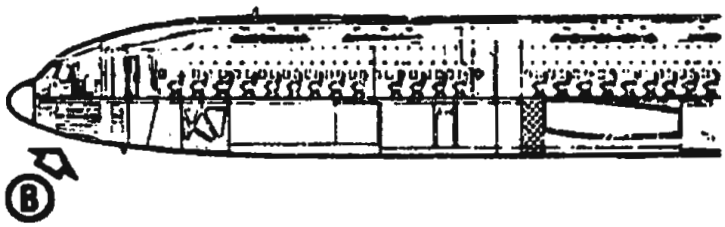
C (3) Lift hold downs to engage tape reproducer retaining brackets and tighten hold downs.

C (4) Install test or entertainment tape cassettes. Check that same part number is installed as was installed in removed unit.

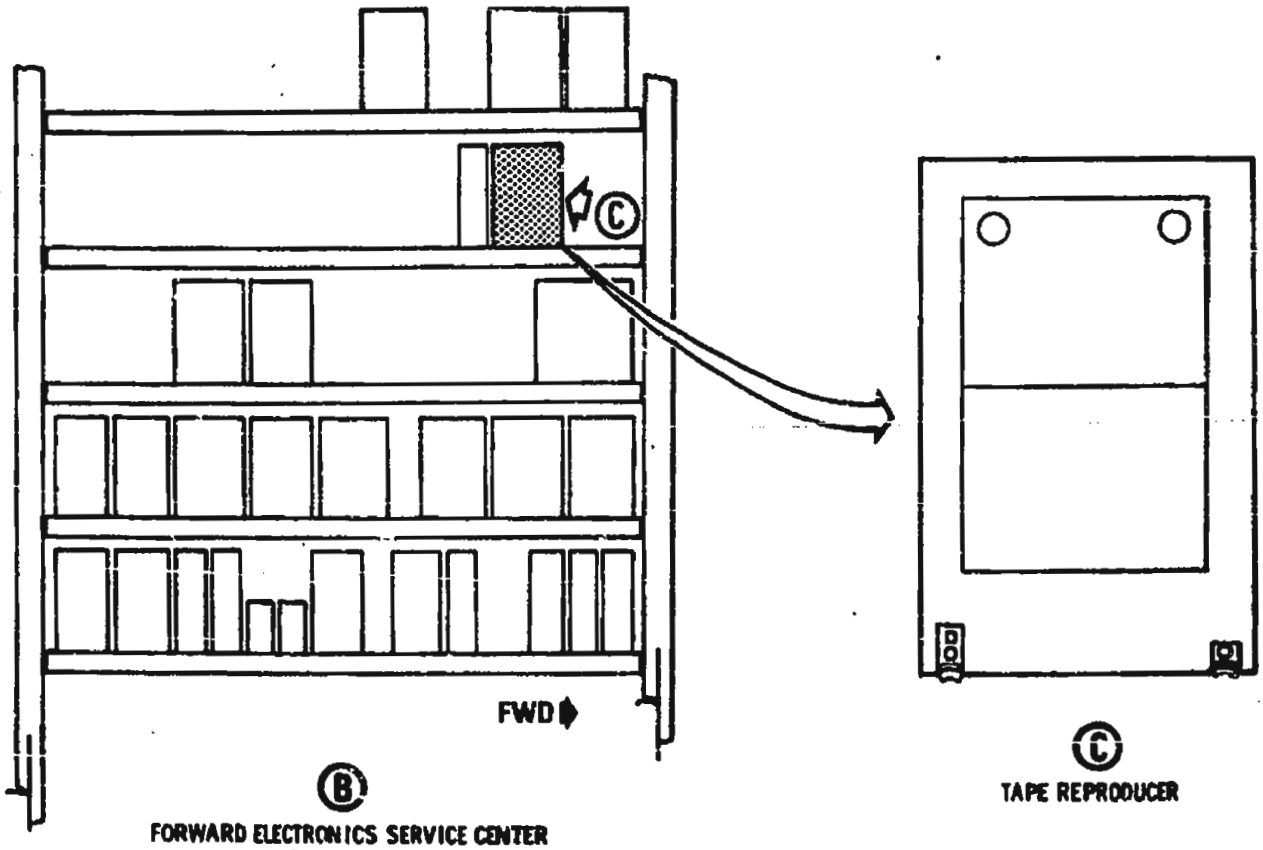
C (5) Remove tags and close circuit breakers opened in Step 2A(1).

C (6) Turn on electrical power (Ref. 24-00-00).

C (7) Perform system test (Ref. 23-37-00, page 501).



FESC ELECTRICAL SERVICE CENTER
ZONE 113



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING OUTBD

TAPE REPRODUCER

M1-0001-29-1326

CR Automatic Announcement Tape Reproducer
CR Figure 401

C CONTROL UNIT - REMOVAL AND INSTALLATION

C 1. Removal/Installation

C A. Removal

C (1) On the FE/SO circuit breaker panel zone 210, open and
C tag circuit breakers PRE-RECORDED ANNOUNCEMENTS AC and
C DC.

C (2) In the passenger compartment at the L-1 Door, remove
C left forward attendant control panel (Ref. Fig. 401).
C Remove panel and auto-announce control unit disconnects
C from aircraft disconnects.

C (3) Remove back plate retaining auto-announce control unit
C in left forward attendant control panel.

C B. Installation

C (1) Verify circuit breakers opened in Step 1A(1) are open
C and tagged.

C (2) Position auto-announce control unit in left forward
C attendant control panel.

C (3) Install back plate removed in Step 1A(3).

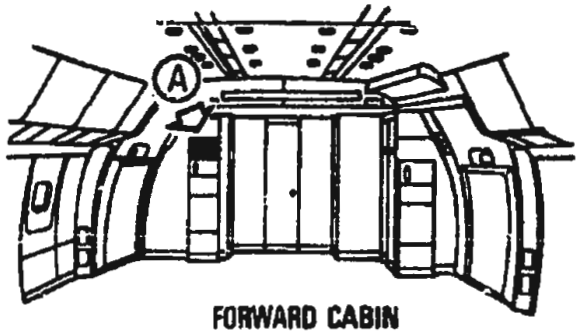
C (4) Connect electrical disconnects removed in Step 1A(2).

C (5) Install left forward attendant control unit removed in
C Step 1A(3).

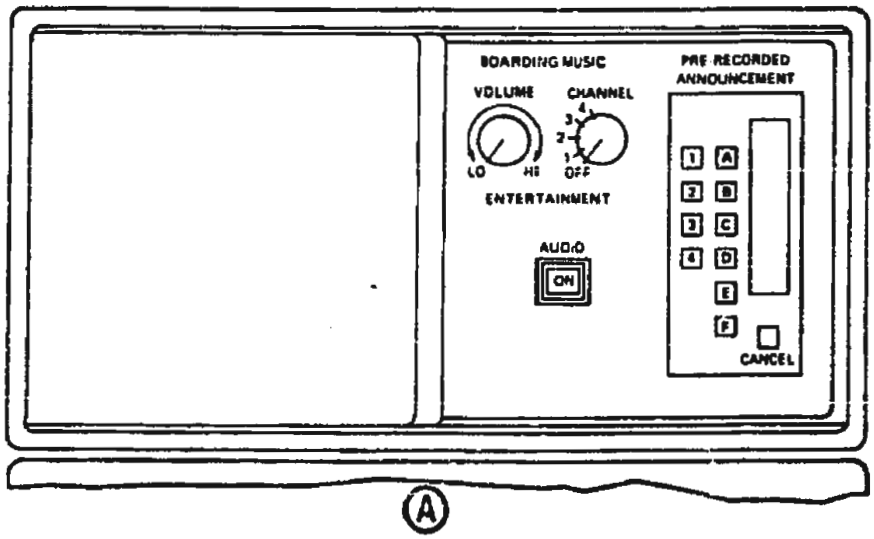
C (6) Remove tags and close circuit breakers opened in Step
C 1A(1).

C (7) Turn on electrical power (Ref. 24-00-00).

C (8) Perform System Test (Ref. 23-37-00, Page 501).



FORWARD CABIN
ZONE 221



LEFT FORWARD ATTENDANT'S CONTROL PANEL

MI-0000-23-1327

C
C Automatic Announcement Control Unit
Figure 401

INTERPHONE - DESCRIPTION AND OPERATION

1. General

Two interphone systems and a call system provide communications for flight and ground crew operations. These systems are as follows:

Cabin and Galley Interphone System (Ref. 23-41-00)

Service Interphone System (Ref. 23-43-00)

Pilot/Mechanic Call System (Ref. 23-45-00)

The flight station, all cabin attendant seat positions, the mid cabin service area, and the galley, are connected to a dialing system and communication lines to form the cabin and galley
R interphone system.

The service interphone system has interphone jacks located at major service areas to form an interphone link for ground operations. The service interphone system and the cabin and galley interphone system are interconnected to increase communication capabilities.

The pilot/mechanic call system provides a calling circuit between the flight station and the nose wheel well to attract the addressee to an interphone communication requirement. A full description and operation of the cabin and galley interphone is discussed in 23-41-00, the service interphone in 23-43-00, and the pilot/mech call system in 23-45-00.

CABIN AND GALLEY INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

1. General

The cabin and galley interphone system (Ref. Fig. 1) is a dual communication system that provides a phone link between 10 attendant stations and the flight station. One audio line of the dual system is common to the flight station and the 10 attendant stations located in the cabin and galley areas; this communication link is the cabin interphone. The second audio line of the dual system is common to only 4 of the 10 attendant
R stations. The four stations are the galley, the mid cabin service center, the cabin attendant position, by the L1 door, and the cabin attendant position by the R4 door (Ref. Fig. 1). This communication link is the galley interphone. The galley interphone provides a galley-to-cabin line for galley operation only, leaving the cabin line open for other interphone use.

The 11 stations that are serviced by the interphone network and their interphone functions are as follows:

Flight station (pilots overhead panel) - cabin

Attendant position by L1 door - cabin and galley

Attendant position by R1 door - cabin

Attendant position by L2 door - cabin

Attendant position by R2 door - cabin

Mid cabin service center - cabin and galley

Galley - cabin and galley

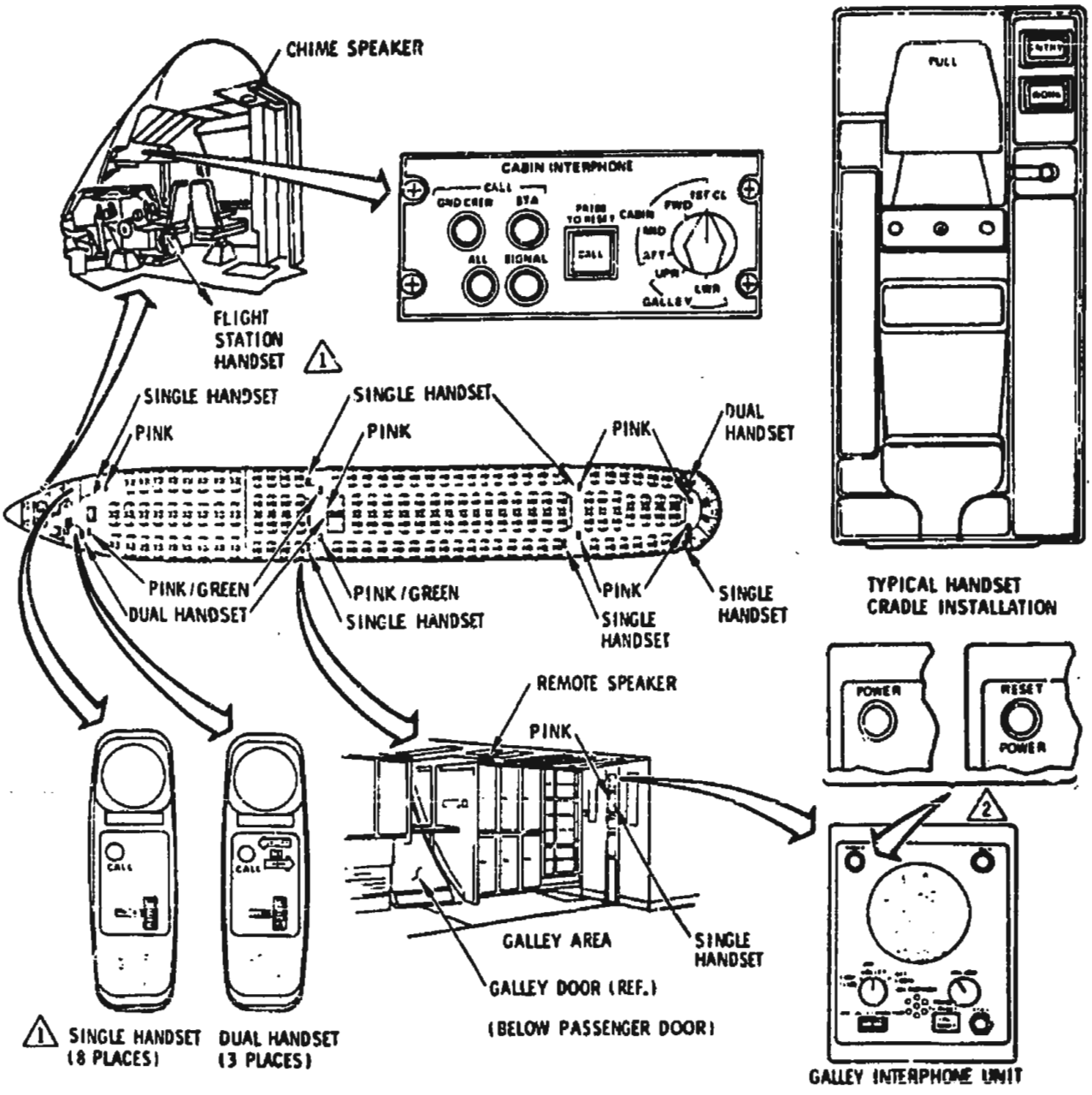
Attendant position by L3 door - cabin

Attendant position by R3 door - cabin

Attendant position by L4 door - cabin

Attendant position by R4 door - cabin and galley

One handset is located at each of the 11 stations. In addition, the galley interphone station has an interphone unit with a built-in speaker and microphone; there is also a remote speaker connected in parallel with the interphone unit speaker. The interphone unit is connected to the galley interphone circuit only. All stations with cabin and galley interphone capability



NOTE

1. FLIGHT STATION HANDSET DOES NOT HAVE SELECTOR SWITCH OR CALL BUTTON INSTALLED
2. TWO MODELS OF THE GALLEY INTERPHONE UNIT (GIU) ARE AVAILABLE. NORMALLY THE POWER LIGHT AND THE ILLUMINATED RESET POWER SWITCHLIGHT ARE ON WITH SYSTEM POWER APPLIED. THE GIU WITH THE RESET POWER SWITCH CONTAINS INTERNAL CURRENT AND VOLTAGE OVERLOAD PROTECTION CIRCUITRY.
3. PINK AND GREEN CALL LIGHTS LOCATED IN BASE OF EXIT SIGNS ON CEILING ABOVE EACH ATTENDANT POSITION (ONLY GREEN LIGHTS BY L1, L2, R2, AND R4 DOORS OPERATE - OTHER GREEN LIGHTS ARE NOT CONNECTED)

M1-0000-23-3603

Cabin and Galley Interphone System Equipment and Location
Figure 1

are designated dual stations and all stations with a cabin capability only are designated single stations.

The cabin interphone audio line is connected to the service interphone system jacks any time power is connected to both systems and the SERVICE INTERPHONE - ON switchlight is depressed (Ref. 23-43-00). The cabin interphone audio line is connected to the flight interphone through the service interphone amplifier any time power is connected to all three systems (SERVICE INTERPHONE - ON switchlight does not have to be depressed), and the MIC SEL - INT and INT CABIN/SERV audio switches on any audio selector panel are depressed (Ref. 23-51-00).

The location of the cabin and galley interphone equipment is as follows:

A control unit (flight station control unit) and a handset (audio only; no dial) in the flight station, zone 210

Seven single handsets (cabin interphone only), one each in the attendant seats by passenger doors R1, R2, R3, L2, L3, and L4, and one in the lower galley between the lifts, zones 232, 241, 242, 263, 264, 273, and 131 respectively

Three dual handsets (cabin and galley interphone), one each in the attendant seats by passenger doors L1 and R4, and one in the mid cabin service center between the lifts, zones 231, 274, and 250 respectively

Two electronic chime speakers, one in the flight station overhead, zone 215, and one in the lower galley ceiling by the galley door, zone 131

An auxiliary microphone in the mid cabin service center between the lifts near the ceiling, zone 250

A galley interphone unit and a remote speaker in the lower galley, zone 131; the galley interphone unit is between the lifts, and the remote speaker is in the ceiling by the galley door

NOTE: The galley interphone unit is available with a POWER indicating light or a RESET POWER illuminated switchlight installed on the front panel, upper left corner. Units with the reset switchlight contain an internal crowbar protection circuit providing current and voltage overload protection. The crowbar circuit will lock out the internal power supply and turn off the RESET POWER light. An internal 4-ampere fuse may blow depending on the severity of the overload. If the fuse does blow before the protection circuit can

disable the power supply within the interphone unit, the unit cannot be reset on. In general, the power supply can be reset once the fault has been isolated and remedied provided the internal fuse is still intact.

R The flight station chime speaker unit is also used with the
R SELCAL system (Ref. 23-22-00) and the pilot/mechanic call system (Ref. 23-45-00).

2. Operation

A digital dialing circuit, which is connected to all interphone stations, is used to operate aural and visual indicator circuits. Aural indication (HI/LO chime) is provided by the chime speaker units in the flight station and galley, and by a series of PA system chime speakers (Ref. 23-31-00) in the first class and coach areas. Visual indication is provided by call lights located near the interphone stations as follows:

Flight station - on the flight station control unit, zone 210

Cabin areas - attached to the lower part of the cabin EXIT signs (Ref. 33-26-00), and on the mid cabin service center handset cradle

Galley area - on the galley interphone unit, and on the handset cradle, zone 131

Pink lights indicate that a call is being made on the cabin
R interphone. Green lights at dual interphone stations indicate that a call is being made on the galley interphone.

NOTE: Green call lights are installed on EXIT signs above all passenger compartment doors, but only the green lights by the dual handset positions (L1, mid cabin service center, and R4 doors) operate. The green lights on the EXIT signs above the R1, R3, L3, and L4 doors are not connected.

Dial and audio information is carried over three separate shielded, twin-twisted cables. The dial line carries digital dial timing information generated by the flight station control unit. The dialing format is a time-division, multiplexed scheme, with each station allocated a time slot (Ref. Fig. 3). Dual stations have separate time slots for both the cabin and galley systems. A thumbwheel selector switch and CALL pushbutton on all handsets (except the flight station) are used to select the station being addressed and to actuate the dialing data which initiates a call. On the flight station control unit

and the galley interphone unit, a selector switch and a call switch are used to dial and call other stations. In addition, the flight station interphone position has the capability of placing a call to all cabin interphone stations simultaneously (CALL - ALL; three HI/LO chimes sound in all areas and all cabin interphone call lights flash twice and come on steady), and signalling attendants (CALL - SIGNAL; one HI chime sounds in all areas each time switch is depressed).

The dual handsets have a GALLEY - CABIN switch on the handset for selecting the cabin or galley interphone line as required. The switch affects the audio and the dial circuits in the handset.

A permanent magnet located on all handset cradles actuates a relay within the handset when the handset is removed or replaced. This relay action controls the audio circuit so that the handset is always connected to the interphone audio circuit with the handset out of the cradle and disconnected with the handset in the cradle.

A. Power Distribution

There is no on/off control for the cabin and galley interphone system; the system is energized whenever power is available on the aircraft bus system and the circuit breakers are closed.

R Power is supplied to the system from the 28V dc ground
R service bus through the CABIN & GALLEY INTPH (L7) circuit
R breaker on the Flight Engineer/Second Officers (FE/SO)
R overhead circuit breaker panel CB2 (Ref. Fig. 2). Power is
R supplied to the pink and green hostess advisory (call)
R lights on the EXIT signs from the 28V dc passenger service bus 3 through the HOST ADVSY IND (C8) circuit breaker on panel CB2.

Power from the CABIN & GALLEY INTPH circuit breaker is supplied to system components as follows:

Galley Interphone Unit - Power supplies for dial line, powered cabin audio and galley audio lines, and chime trigger for lower galley electronic chime speaker.

NOTE: The galley interphone unit is available in two models. One unit has a POWER indicating light in the upper left corner on the front panel. The other unit is equipped with an illuminated POWER RESET switch installed in the same position. POWER indicator and POWER RESET switchlights are normally on. The unit with the POWER RESET switch has the capability of resetting internal circuitry if the fault occurs in

an external component of the cabin/galley interphone system (dial line short). If a fault occurs within the galley interphone unit; an internal 4-ampere fuse may blow preventing the reset action (POWER RESET light remains off after pressing to reset).

Electronic Chime Speakers - Regulated power supplies for speaker control logic, audio oscillator, pulse generator, modulator, and output amplifier circuits.

Call Lights - Pink call lights on handset cradles in mid cabin service center and lower galley.

Flight Station Control Unit - Chime trigger outputs for flight station, first class, and coach chimes.

R R The dial line output from the galley interphone unit is 77 (±5)V dc. The dial line output is connected to each interphone handset (except flight station) in series; the dial line is terminated in the flight station control unit. A pair of zener diodes in each handset is connected in series with the dial line. The zener diodes drop 5.1V dc across each handset; this 5.1V dc is the power source for the handset dial logic circuits. The excess (remaining) voltage is dropped in the flight station control unit.

R The powered audio line outputs from the galley interphone unit are 15.5 (±2.5)V dc each. The powered cabin audio line is connected to all handsets and the flight station control unit in parallel. The powered galley audio line is connected to all dual handsets and the galley interphone unit in parallel. The powered audio lines are the power source for the audio circuits in the handsets, and the audio output amplifier in the flight station control unit (interface between cabin interphone and service interphone - Ref. 23-43-00).

B. Transmitting Calls

The dial logic circuits at each interphone position are synchronized by the frame sync and clock pulses generated in the flight station control unit. The logic circuits are reset by each sync pulse, and then count the clock pulses to enable the dial logic during the correct time slot(s).

When a station address is selected and the call switch is depressed at any (calling) station, the dial logic circuits are set to generate a data (call) pulse during the correct time slot. The logic circuits count the clock pulses after frame sync, and when the number of clock pulses corresponds to the address of the selected (called) station, a call data pulse is transmitted on the dial line. The calling station

continues to generate a call pulse during the selected time slot in each frame until the call is cancelled.

A call can only be cancelled from the calling station; a call can be cancelled by moving the call selector to a new position, switching the handset from GALLEY to CABIN or vice versa (dual handsets only), depressing the call reset switchlight (flight station and galley interphone units only), or returning the handset to the cradle (all stations except the galley interphone unit).

If a call is cancelled from the calling station before the called station answers, the call light(s) at the called station will reset (go off).

If a call is placed from the flight station control unit with the flight station handset in the cradle, the control unit PRESS TO RESET - CALL light comes on. The light goes out when the call is cancelled by depressing the CALL switchlight. This provides a reminder to the flight crew to cancel calls made using headsets and microphones through the audio integrating system - cabin/galley interphone system interface.

C. Receiving Calls

Each handset position (except flight station) is addressed by jumper wires in the aircraft disconnect plug. The address jumpers control the dial logic in the handset for detecting (receiving) calls. There are four handset pairs on the cabin interphone circuit; they are the handsets by
R the L1 and R1 passenger doors, by the L2 and R2 passenger
R doors, by the L3 and R3 passenger doors, and by the L4 and
R R4 passenger doors. Both handsets in each pair are addressed to receive cabin interphone calls during the same time slot.

The dial logic circuits at each station count the pulses after each frame sync pulse. When the number of clock pulses corresponds to the address position of the station, the dial logic circuits are enabled to receive calls. If a call data pulse appears on the dial line when the receive logic is enabled, a relay is energized to provide a ground to the call light. In dual handsets, separate logic circuits and relays control the cabin and galley call lights.

The relays deenergize and the call light(s) go off when the handset at the called station is removed from or returned to the cradle, or when the call reset switchlight is depressed (flight station and galley interphone units only). When the

call lights have been reset, they can not be turned on again until the call has been cancelled by the calling station.

In cabin interphone handset pairs, the call light control relays are connected in series, and the call lights on the EXIT signs above both handsets are connected in parallel. This allows both call lights to be reset from either handset.

D. Chimes

The flight station control unit monitors the dial line for calls to the flight station, first class, or coach areas. When a call to one of the three areas is detected, a relay
R in the control unit closes to provide a 28V dc pulse to the appropriate chime circuit.

When a call is made to the flight station, the flight station control unit provides a pulse to the HI/LO input of the flight station chime speaker. When a call is made to the 1 CLASS address (first class), the control unit provides a pulse to the HI/LO chime input of PA amplifier No. 1 (Ref. 23-31-00). When a call is made to the FWD CAB, MID CAB, or AFT CAB addresses (coach area), the control unit provides a pulse to the HI/LO chime input of PA amplifier No. 2.

The galley interphone unit monitors the dial line for calls to the galley. When a call to the galley is detected, a
R relay in the interphone unit closes to provide a 28V dc pulse to the galley chime speaker unit HI/LO input.

E. Additional Calls

When a call is in progress from any interphone station to any (called) station, and another station calls the same (called) station on the same interphone line (cabin or galley), the call lights and chimes do not respond. The second calling station does generate call data pulses, and the calls from all calling stations must be cancelled before the called station can receive another call.

When a call is in progress from any interphone station to any dual handset (called) station on the cabin or the galley interphone line, and another station calls the same (called) station on the other interphone line, the call lights and chimes respond normally. When the dual handset is lifted from the cradle with the GALLEY - CABIN switch in either position, the call lights for that interphone line reset; when the switch is moved to the other position with the handset out of the cradle, the call lights for the other line reset.

When a call is in progress from any interphone (calling) station, the calling station can receive a call (dual handsets can receive a call on either line). The call lights and chimes respond normally; the call lights reset when the handset is returned to the cradle or the call reset switchlight is depressed (flight station and galley interphone units). On dual handsets receiving a call on one line with GALLEY - CABIN switch selected to other line, the call lights will reset when the switch is selected to the line on which the call was made.

When calls are in progress between any stations, and another call is made between any other stations, the call lights and chimes at the other (called) station respond normally.

F. Flight Station

The flight station CABIN INTERPHONE control unit contains circuitry for interphone dial and chime control, and connects the flight station handset and chime speaker with the other cabin interphone stations. In addition, the control unit receives and interprets the dial circuit inputs, provides trigger pulses to activate the chime circuits, and amplifies the cabin interphone audio for the service and flight interphone interface.

The control unit includes a 6-position rotary dial control to allow selection of CABIN - 1ST CL, FWD, MID, and AFT; and GALLEY - UPR and LWR. Four CALL switches allow stations to be called as follows:

STA - Directs one HI/LO chime to chime speakers in area of station being called, and lights cabin interphone call light(s) on handset cradle or EXIT signs at called station.

ALL - Directs three HI/LO chimes to all chime speakers in flight station, passenger compartment first class and coach areas, and lower galley, and causes all cabin interphone call lights to flash twice, and then come on steady.

SIGNAL - Directs one HI chime tone to all chime speakers in flight station, passenger compartment first class and coach areas, and lower galley each time the SIGNAL switch is depressed.

GND CREW - Part of pilot/mechanic call system (Ref. 23-45-00).

A blue PRESS TO RESET - CALL switchlight on the control unit comes on to indicate that a call has been made from the unit with the handset in the cradle, or that a call is being directed to the flight station from another station on the

cabin interphone system. Lifting the flight station handset from its cradle or depressing the CALL switchlight turns the light off. If a CALL - STA or ALL call has been initiated from the flight station control unit, depressing the CALL switchlight turns off the lights of the called station to cancel the call.

To operate the interphone, the selector switch is positioned to the station to be addressed, the handset is removed from the cradle, and the CALL - STA pushbutton is pressed. The HI/LO chimes in the area being called are activated (Ref. 23-31-00) and the pink call light at the station comes on. When the CALL - ALL pushbutton is pressed, the pink call lights at all cabin interphone stations flash twice and then come on steady, and the chime speakers in all areas sound three HI/LO chimes.

G. Single Unit Attendant Station

The single unit attendant stations provide interphone communication on the cabin line only. Each single handset contains dial logic and audio circuitry. The dial logic generates dialing data when the CALL button is pressed. A dialing thumbwheel switch is located on each single handset. Moving the dialing switch selects the interphone stations as displayed in a window on the handset. The designations that are displayed in the dial window and the interphone stations they represent are as follows:

FLT STA - flight station

1 CLASS - attendant seats by L1 and R1 doors

FWD CAB - attendant seats by L2 and R2 doors

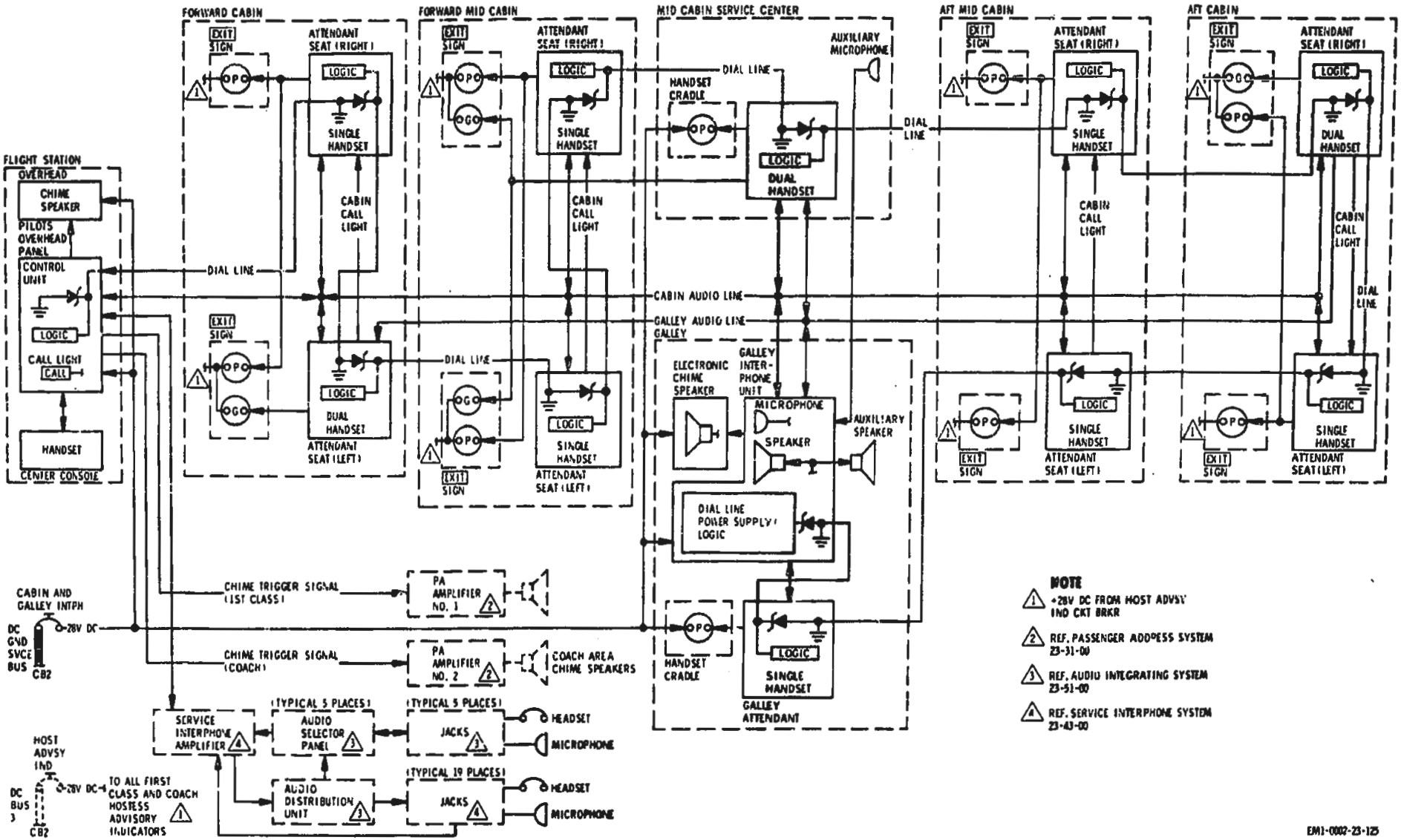
MID CAB - attendant seats by L3 and R3 doors

AFT CAB - attendant seat by L4 and R4 doors

UP GALY - mid cabin service center

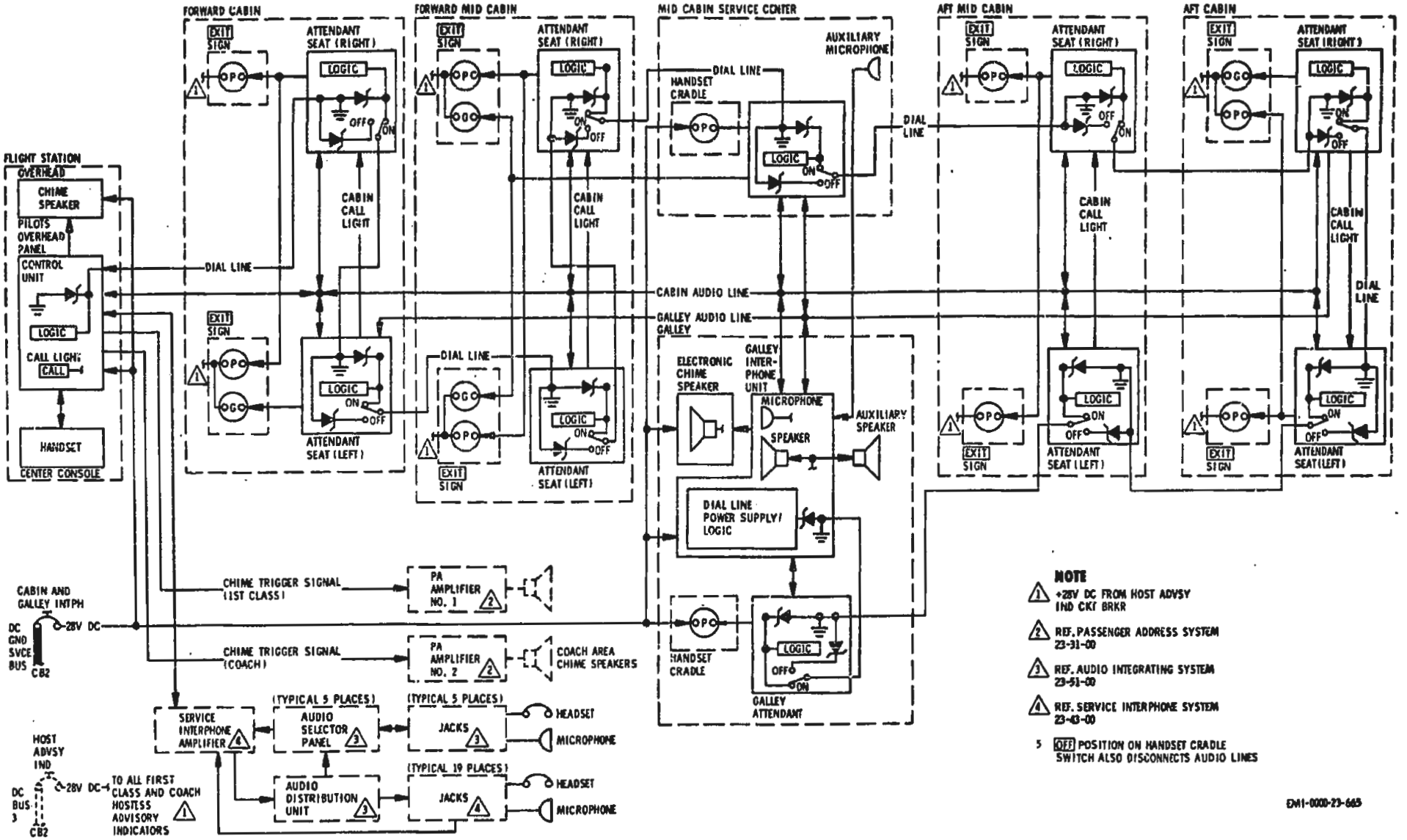
DN GALY - lower galley

All the above stations can communicate on the cabin interphone line. When the handset is removed from the cradle, the thumbwheel switch is positioned to the station to be addressed and the CALL button is pressed, the HI/LO chimes sound and the pink call light comes on at the station being called. When a call is received at a single interphone station, the handset is lifted to activate the audio circuit and reset the call light at that station.



Cabin and Galley Interphone System Block Diagram
Figure 2

R EFFECTIVITY: 001-031
R
0018



Cabin and Galley Interphone System Block Diagram
Figure 2

EFFECTIVITY: 032-999

001B

H. Dual Unit Attendant Station

The dual interphone stations are capable of communication on either the cabin or galley interphone lines. Located on each dual handset is a dialing thumbwheel switch, a CALL pushbutton, and a two-position GALLEY - CABIN selector switch. The dial switch window display is the same as the single handset. When the switch is in the GALLEY position, the handset is connected to the galley interphone line only. The GALLEY position functions with the 1 CLASS, UP GAL, DN GAL, and AFT CAB positions of the dial switch. When the switch is in the CABIN position, the handset is connected to the cabin interphone line only. The CABIN position functions with all positions of the dial switch as in the single handset stations.

The dual unit is operated in the same manner as the single unit after selecting the GALLEY or CABIN interphone system. The HI/LO chimes sound in the area being called, and the pink or green call light comes on at the station being addressed.

The mid cabin service area station also has an auxiliary microphone which is fixed in position and connected directly to the galley interphone unit. The auxiliary microphone, which is turned on or off at the lower galley interphone unit, is used to communicate with the galley without using the handset.

I. Galley Station

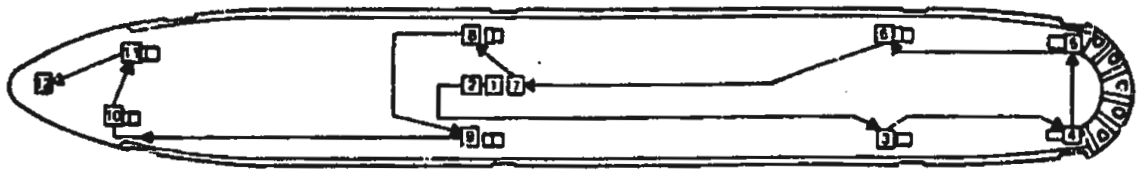
Unlike the other three dual unit stations, the galley station has two separate units, one for the cabin interphone and the other for the galley interphone. The cabin unit is a single handset unit attendant station which operates on the cabin interphone line only. The galley interphone unit is also a single station, but operates on the galley interphone line only. A microphone and speaker are built into the galley interphone unit, and a remote speaker is connected in parallel. The remote speaker is located in the galley ceiling. The cabin interphone controls located on the galley interphone unit are: a three-position selector switch designated FIRST CLASS/UPPER GALLEY/AFT CABIN, VOLUME control, CALL button, UPR GALLEY MONITOR ON/OFF switch, POWER indicator light or RESET POWER illuminated switchlight, TALK switch and PRESS TO RESET - CALL/RESET switchlight. The selector switch is used for dialing the other three galley interphone stations. The VOLUME control regulates the level of received audio for both speakers. The CALL button initiates the call (generates dialing data) to the selected station. The UPR GALLEY MONITOR ON/OFF switch controls the mid cabin service center auxiliary

microphone. The POWER indicator light comes on whenever power is on the system. The TALK switch keys the galley interphone unit microphone. The PRESS TO RESET - CALL/RESET switchlight illuminates to indicate an outgoing call. Depressing the switchlight resets the light.

The galley interphone unit is available with a POWER indicating light or a RESET POWER illuminated switchlight installed on the front panel, upper left corner. Units with the reset switchlight contain an internal crowbar protection circuit providing current and voltage overload protection from system faults (dial line short, for example) and from faults within the unit proper. The crowbar protection circuit includes a 4-ampere fuse installed internally in the galley interphone unit. If the fault is of sufficient magnitude to blow the fuse, pressing and releasing the RESET POWER switchlight will have no effect (switchlight will not come on, indicating no reset). If the protection circuitry shuts down the interphone unit power supply prior to the fuse blowing, the unit can be reset after fault isolation by pressing and releasing RESET POWER switchlight.

The galley interphone unit interfaces with the lower galley single interphone handset and the electronic chime speaker for dial line and chime tones. The electronic chime speaker is identical to the flight station electronic chime speaker. The HI/LO chime output is used for the CALL-STA and ALL functions, the HI chime output is used for the CALL - SIGNAL function, and the LO chime output is used for the NO SMOKING and FASTEN SEAT BELTS sign functions (Ref. 33-29-00). The galley interphone unit is operated by selecting the station to be called on the selector switch and pressing the CALL button. At the station being addressed, the green call lights come on and the area HI/LO chimes sound. Voice contact can be made by depressing the TALK switch after the handset is lifted at the addressee station. When another galley interphone station is calling the galley, the electronic chime speaker sounds a HI/LO tone to alert the galley attendants. Depressing the TALK switch enables the galley interphone unit microphone.

When the caller speaks, audio is automatically heard over the two galley speakers. The audio level can be controlled by the cabin interphone unit VOLUME control. The mid cabin service area auxiliary microphone operation is controlled by the ON/OFF switch located on the cabin interphone unit. When the switch is in the ON position, the microphone is on and all audio in the auxiliary microphone area is carried over the galley speakers. Whenever a call is received from the forward or aft cabin stations on the galley interphone, the audio input from the mid service center auxiliary microphone is interrupted.

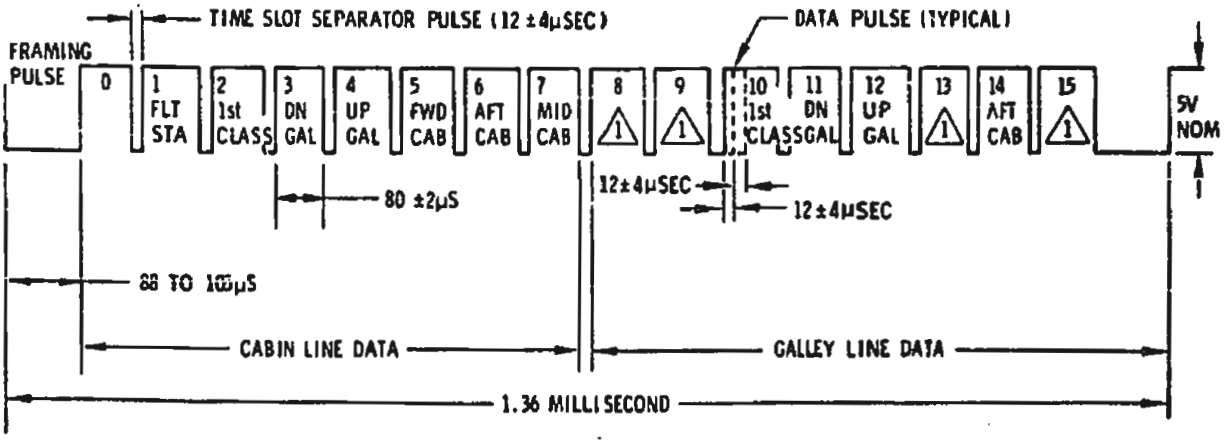


DIAL LINE SEQUENCE	
POSITION/LOCATION	*NOMINAL DIAL LINE VOLTAGES
1 - GALLEY INTPH UNIT	N/A
2 - LWR GALLEY HANDSET	75V DC
3 - L3 DOOR	70V DC
4 - L4 DOOR	65V DC
5 - R4 DOOR	60V DC
6 - R3 DOOR	55V DC
7 - UPPER GALLEY	50V DC
8 - R2 DOOR	45V DC
9 - L2 DOOR	40V DC
10 - L1 DOOR	35V DC
11 - R1 DOOR	30V DC
12 - FLT STN CONT UNIT	25V DC

NOTE

POSITIONS 1 AND 2 ARE LOCATED IN THE LOWER GALLEY BETWEEN THE GALLEY LIFTS

*DIAL LINE VOLTAGES SHOWN ARE VALUES RECORDED WHEN A HANDSET OR FLT STN. CONTROL UNIT IS DISCONNECTED AND SYSTEM IS OPERATING UNDER NO LOAD CONDITIONS DURING TROUBLESHOOTING.



NOTE

⚠1 NOT USED

EM1-0102-23-149

Dial Line Sequence And Pulse Train
Figure 3

3. Cabin Interphone

A cabin interphone call can be received or initiated at any of the 11 interphone stations. When the handset is removed from the cradle, a magnet in the cradle operates a relay in the handset. The relay contacts connect the cabin interphone audio line to the handset audio circuit. In the dual handsets, the GALLEY - CABIN switch is set to CABIN to complete the cabin interphone circuit. Calls from the flight station can be initiated without removing the handset from the cradle. Audio from the handset microphone is routed to all station handsets over the cabin interphone line. The audio is heard at the handset receiver when it is removed from the cradle.

When the dial control is selected to the station being called and the CALL button is depressed, a data pulse is generated and inserted on the dial line. The addressed station detects the data pulse and the cabin relay is energized, which completes the circuit to the call light. The call light comes on at the addressed station and remains on until the cabin relay is reset by removing the handset from the cradle. In addition, the data pulse is sensed by the flight station control unit. If the call was to the forward cabin attendant seat positions, the No. 1 PA amplifier is triggered by the flight station control unit to generate a HI/LO chime for the first class area (Ref. 23-31-00). If the call was to any of the remaining cabin attendant positions, the No. 2 PA amplifier is triggered by the flight station control unit to generate a HI/LO chime for the coach area. A call to the flight station or the galley interphone station results in the chime speaker unit being triggered for the respective station.

4. Galley Interphone

A galley interphone call can be received and initiated at three positions in the cabin, and one in the galley. At the dual-handset stations, the GALLEY - CABIN switch must be set to the GALLEY position to complete the galley interphone circuit. The galley interphone circuit operation is the same as that described for the cabin interphone except for the galley interphone unit and the call lights. The interphone units actuate the green call light circuit for galley calls. When a call is made to the galley interphone unit, the audio is heard on the galley speakers.

When the galley interphone unit UPR GALLEY MONITOR switch is in the ON position, sounds picked up by the mid cabin service center remote microphone are continually applied to the galley speakers through a relay circuit. Galley calls initiated by the forward or aft cabin dual stations generate a data pulse which energizes the relay circuit. In the energized position, the

relay contacts disconnect the remote microphone from the galley line for the duration of the call.

R CABIN/SERVICE AND GALLEY INTERPHONE SYSTEMS - DESCRIPTION AND R OPERATION

R 1. General

R The Cabin/Service Interphone System and Galley Interphone System R are used for communications between crew members and service and R maintenance personnel. Visual and aural indications are R provided to alert personnel that their station is being called. R Each system is covered separately in this section.

R The Cabin/Service Interphone System audio line is connected to R the Service Interphone System jacks any time SERVICE INTERPHONE R ON switchlight is pressed (Ref. 23-43-00).

R The Cabin/Service Interphone System audio line is also connected R to the Flight Station Interphone System through the R Cabin/Service Interphone Accessory Unit any time power is R applied to both systems and the MIC SEL INT and INT CAB/SER R audio switches on any Audio Selector Panel are depressed (Ref. R 23-51-00).

R 2. Cabin/Service Interphone System

R A. Description

R The Cabin/Service Interphone System is used for R communication between the flight station, lower galley, and R all the attendant seat stations by the passenger doors.

R The Cabin/Service Interphone System consists of an Accessory R Unit, a Control Panel, eight cabin attendants handsets, and R ten electronic chimes. Reference Figure 1.

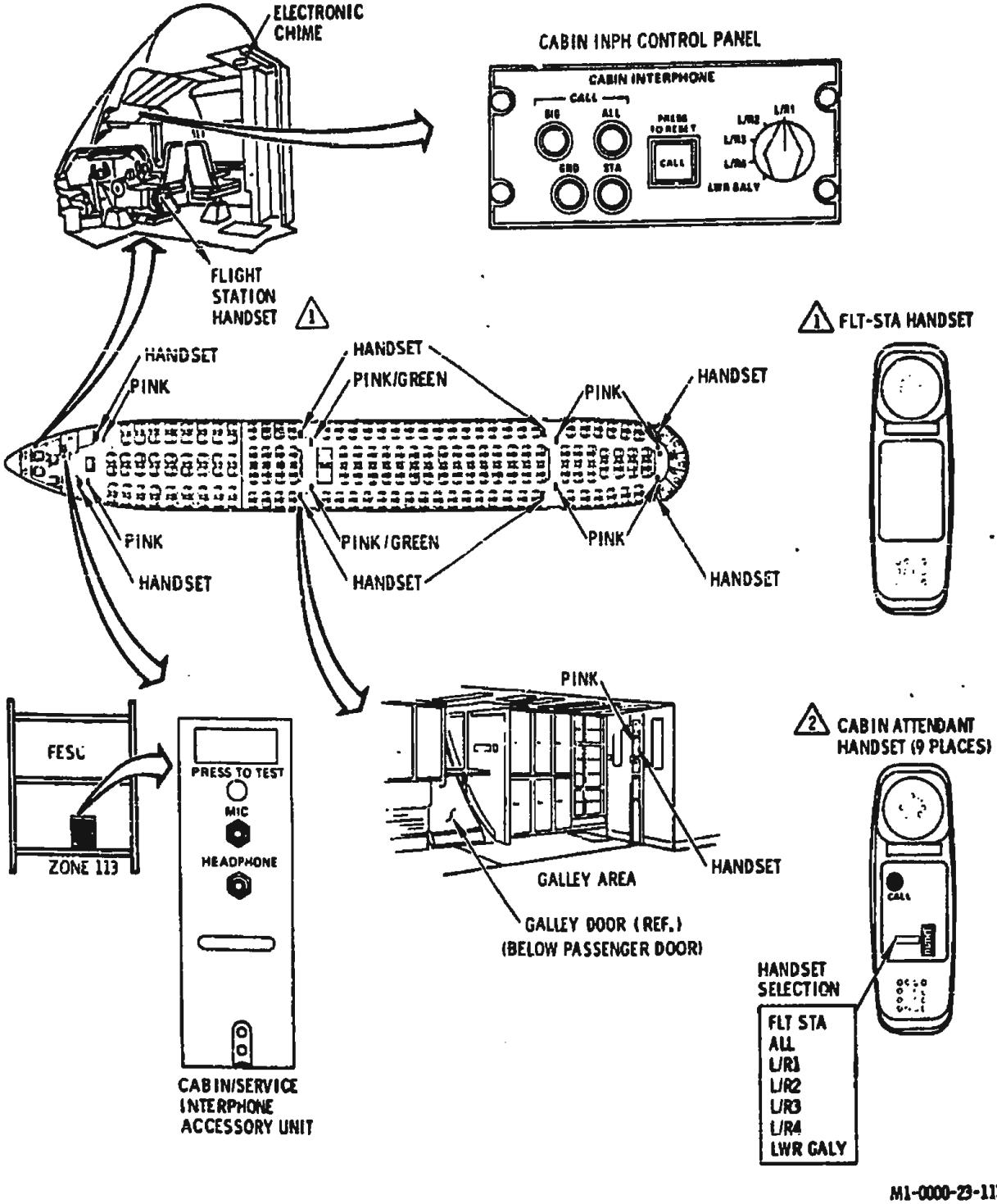
R The locations of the Cabin/Service Interphone Equipment is R as follows:

R (1) A Cabin/Service Interphone Accessory Unit in the R forward electronic Service Center (FESC), zone 113.

R (2) A Control Unit in the flight station and on handset R (audio only, no dialing capabilities) in the flight R station, zone 210.

R (3) One handset and one electronic chime by each attendant R seat (eight total).

R (4) One electronic chime in the flight station overhead, R zone 213, and one in the lower galley overhead ceiling.



R R Cabin/Service Interphone System Equipment and Location
Figure 1

R R R R EFFECTIVITY: 032-999

R (5) Pink Call light on the EXIT signs by each passenger
R door (Ref. 33-26-00).

R B. System Components

R (1) Cabin/Service Interphone Accessory Unit - Contains line
R switching circuits, control circuits, ALL CALL timing
R and chime drive circuits and power supply circuits.

R The Accessory Unit performs the following functions:

R (a) Receives "call" signals from the flight and
R attendant stations and develops chime and light
R activation to alert the recipient of an incoming
R call (Station or All Call).

R (b) Provides operating power to Cabin/Service and
R Service Interphone Systems.

R (c) Interfaces Cabin/Service and Service Interphone
R Systems with Flight Interphone System and Audio
R Integrating System.

R (2) Control Unit

R Composed of the following: ALL CALL push button, a
R STATION CALL push button, a SIGNAL push button, a GND
R CALL push button, a press to reset blue switchlight, a
R rotating switch with L/R1, L/R2, L/R3, L/R4, and LOWER
R GALLEY selections.

R The Control Unit performs the following functions:

R (a) Provides a ground through the STA CALL logic
R circuit when dialing a STA CALL.

R (b) A ground is also supplied to the ACC UNIT which in
R turn sounds the appropriate Hi-Low chimes.

R (c) In an ALL CALL it enables the ALL CALL logic,
R which turns on the Control Unit CALL lights. A
R signal is also provided to the ACC UNIT which in
R turn signals all interphone stations of an ALL
R CALL.

R (d) Calls to the flight station will cause the call
R light to illuminate and may be cancelled by
R depressing the call light.

R (e) A ground crew call is actuated by depressing GND
R crew call.

R (f) Hi chime signaling is generated each time the SIG
R button is depressed.

R (g) 28V DC supplies all electronic chimes to sound the
R Hi and Low chime.

R (3) Cabin Attendant Handset - Is a self contained unit
R which has circuitry to transmit and receive calls.
R Each handset contains the following components: a
R microphone, a speaker, a call switch, a thumbwheel
R selector switch, a 50-second call reset timer, power
R supply, and a magnetically actuated hook to disconnect
R handset from audio line.

R (4) Flight Station Handset - The flight station handset is
R located at pilot's station, which is shared by the
R Captain and the First Officer. The flight station
R handset contains the following components: a
R microphone, a speaker, and a magnetically actuated hook
R switch to disconnect handset from audio line, but it
R does not have a thumbwheel selector switch.

R (5) Lower Galley Handset - Is located in the lower galley
R between the lifts. It has the same functions as the
R cabin attendant handset.

R (6) Electronic Chimes - An electronic chime is located at
R each cabin attendant station, the flight station, and
R the lower galley. Each unit receives its signals from
R the ACC UNIT and is powered from the CALL SYSTEM
R circuit breaker, D9.

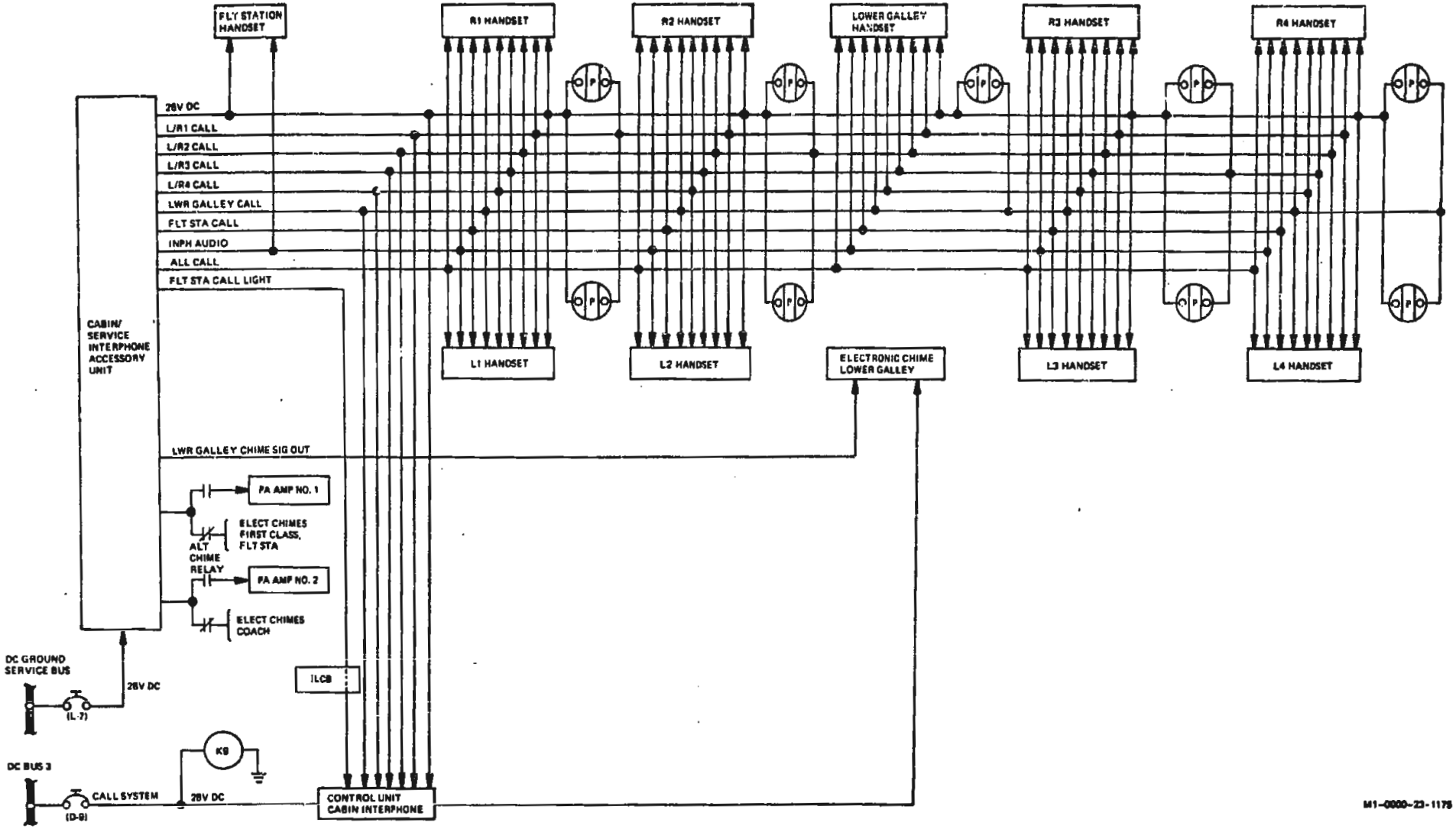
R (7) Call Lights - Pink call lights on the EXIT signs at
R each door are powered and activated by the
R Cabin/Service Interphone Accessory Unit.

R C. Operation

R Figure 2 is the block diagram of the Cabin/Service
R Interphone System.

R The Cabin/Service Interphone System is a hard wire call
R system that operates on a continuous basis once power is
R applied to the electrical buses and the CABIN/SVCE INTPH
R (L-7) circuit breaker is closed.

R (1) Flight Station Calls - Calls from the flight station to
R attendant stations are made by selecting the station
R (on the Cabin Interphone Control Unit) and depressing
R the "STA" switch. The call light(s) at the station
R being called will illuminate and a high-low chime will
R sound once (providing that a call is not already in



Cabin/Service Interphone Block Diagram
Figure 2

EFFECTIVITY: 032-999

0058

process to the station being called). The "CALL" switch light on the Cabin Interphone Control Unit will illuminate whenever a call is placed to or from the flight station. Calls may be placed to and from the flight station whether the flight station handset is in or out of the cradle. Separate chime signal outputs are provided for each station. A call is cancelled by the following means:

(a) Returning handset to cradle (providing call was placed with handset out of the cradle).

(b) Selecting a different station address.

(c) Momentarily depressing "CALL" switch/light.

An "all call" is made by momentarily depressing "ALL" switch on the Cabin Interphone Control Unit. All the cabin call lights and flight station "CALL" switch/light will flash on and off two times and then remain illuminated. All the high/low chimes will sound each time call lights illuminate. An "all call" is cancelled in the same manner as a station call. As an "all call" is placed, any station calls in progress are cancelled automatically.

(2) Attendant Station Calls - A station call is made by removing a handset from its cradle, selecting a station and momentarily depressing the call button. Call light(s) at the station being called will illuminate and a high-low chime will sound once (providing a call is not already in process to the station being called). Separate chime signal outputs are provided for each station. Calls are placed to a station whether or not the handset in the station being called is in its cradle. Calls are cancelled by the calling station when its handset is returned to cradle or by selecting a different station.

(3) Attendant All Calls - An "all call" is made by removing the handset from its cradle, selecting "ALL" and momentarily depressing the call button. All cabin (and DN GALY when applicable) call lights will flash on, then off two times and then remain illuminated. All cabin high/low chimes will sound each time the call lights illuminate. An "all call" is cancelled in the same manner as a station call. When an "all call" is placed, any station calls in process are cancelled automatically.

R 3. Galley Interphone System

R A. Description

R The Galley Interphone System is a two-station system
R connecting the lower and upper galleys that operates
R independently of the other interphone systems.

R The Galley Interphone System consists of:

R (1) The Galley Interphone Unit, located in the lower
R galley.

R (2) An auxiliary speaker in the lower galley overhead.

R (3) The Upper Galley handset, located in the upper galley
R between the lifts.

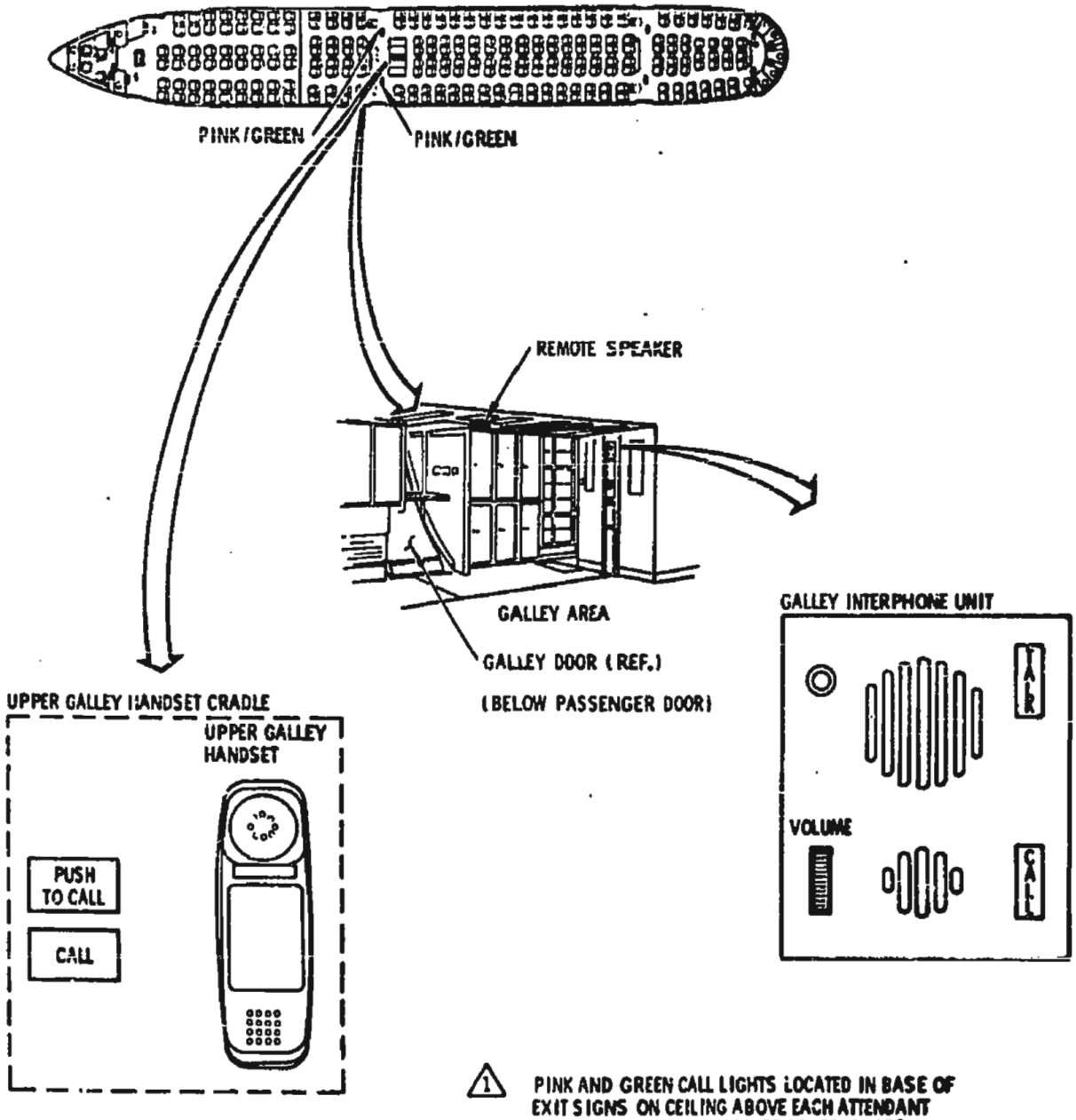
R (4) Green galley CALL lights on the R2/L2 exit locators and
R the Upper Galley handset cradle. Reference Figure 3.

R B. Operation

R Figure 4 is the block diagram of the Galley Interphone
R System. The Galley Interphone System operates on a
R continuous basis once power is applied to the electrical
R buses and the GALLEY INPH (B-20) circuit breaker is closed.
R Pressing the CALL push button on the Galley Interphone Unit
R supplies a ground to the 50-second timer, which in turn
R grounds the green call lights located in the upper galley
R handset cradle and L2/R2 exit locators.

R The CALL push button supplies 28V DC to electronic chimes at
R L2 and R2 causing them to chime once.

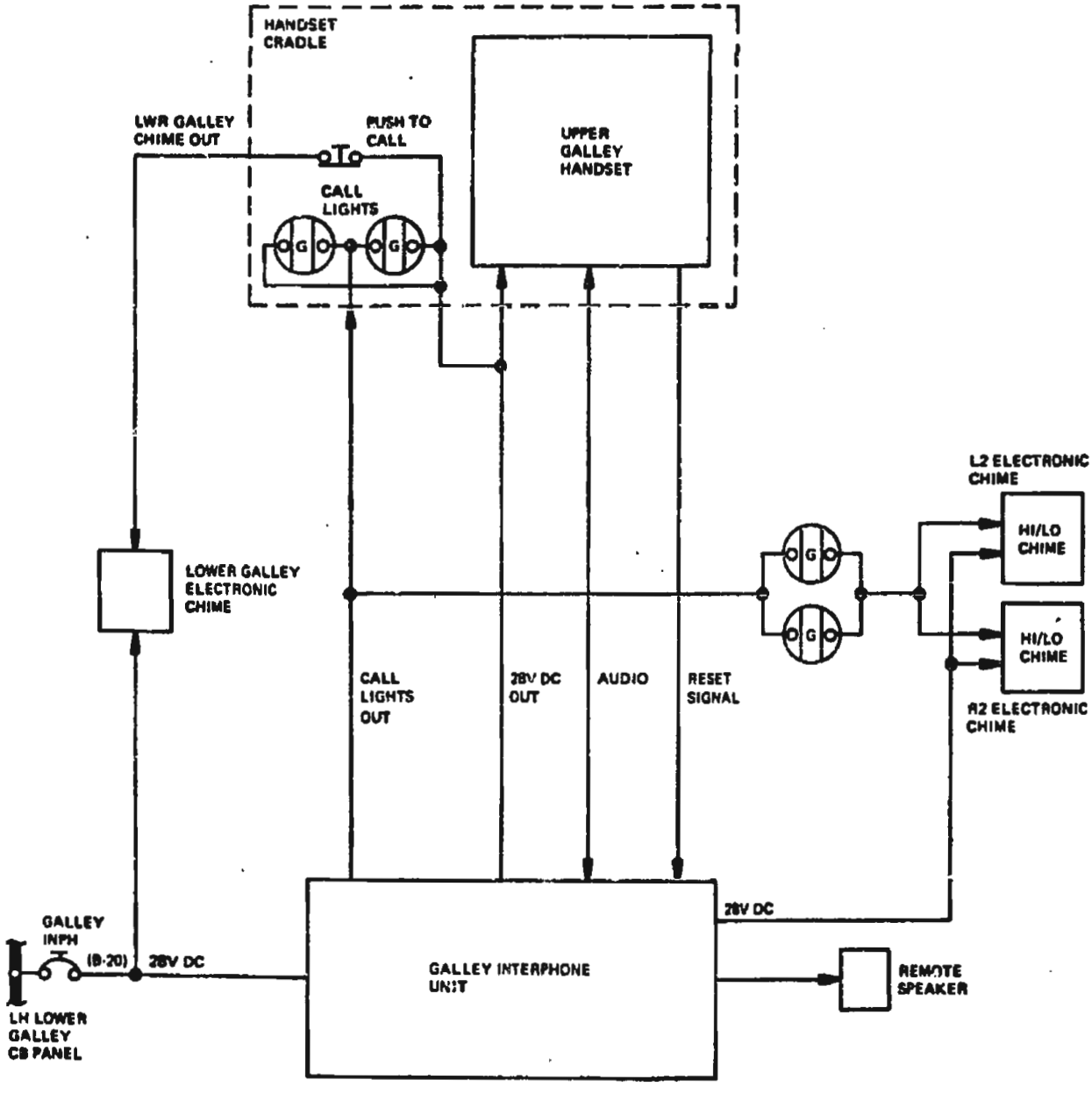
R If the upper galley handset is removed before 50 seconds are
R up, 28V DC power is supplied to the handset via a
R magnetically activated switch that closes and also resets
R the 50-second timer and extinguishes the call lights.
R Pressing the PUSH-TO-TALK switch on the Galley Interphone
R Unit stops incoming audio and connects the MIC to the audio
R line, where it is routed to the Upper galley handset to be
R amplified and supplied to the headset speaker. Pressing the
R PUSH-TO-CALL switch on the upper galley handset cradle
R provides a signal to the Galley electronic chime. Handset
R audio is amplified and routed to the Galley Interphone Unit,
R where it is amplified and supplied to the Galley Interphone
R speaker and remote speaker.


PINK/GREEN
PINK/GREEN
REMOTE SPEAKER
GALLEY AREA
GALLEY DOOR (REF.)
(BELOW PASSENGER DOOR)
UPPER GALLEY HANDSET CRADLE
UPPER GALLEY HANDSET
PUSH TO CALL
CALL
GALLEY INTERPHONE UNIT
VOLUME
1 PINK AND GREEN CALL LIGHTS LOCATED IN BASE OF EXIT SIGNS ON CEILING ABOVE EACH ATTENDANT POSITION (ONLY GREEN LIGHTS L2, R2, DOORS OPERATE - OTHER GREEN LIGHTS ARE NOT CONNECTED)
M1-0000-23-1177

R R Galley Interphone System Equipment and Location
Figure 3

R EFFECTIVITY: 032-999

R R R 0058



M1-0000-23-203

R R Galley Interphone System Block Diagram
Figure 4

R R R R EFFECTIVITY: 032-999

0058

CABIN AND GALLEY INTERPHONE SYSTEM - FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, R the code number can be found in the Fault Isolation Reference R Table in the Chapter 23 Fault Code Index. The index specifies R the exact maintenance manual section, fault isolation diagram, R and block number on the diagram where the fault isolation R procedure should start. Schematics are included at the end of R the section to supplement the fault isolation diagrams or as an R aid in isolating a problem not covered on the diagrams. Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 is a list of all Cabin and Galley Interphone fault isolation diagrams.

Cabin and Galley Interphone System Fault Isolation Diagrams
Table 101

FIGURE	TITLE
101	Component Location Index
102	Cabin and Galley Interphone System - Locator diagram
103	Chimes and Call Lights Inoperative (Dial Line Fault)
104	Chimes Inoperative (Call Lights OK)
105	Call Lights Inoperative (Chimes OK)
106	Cabin Interphone Audio Defect (Chimes and Call Lights OK)
107	Galley Interphone Audio Defect (Chimes and Call Lights OK)

Cabin and Galley Interphone System Fault Isolation Diagrams (Cont)
Table 101

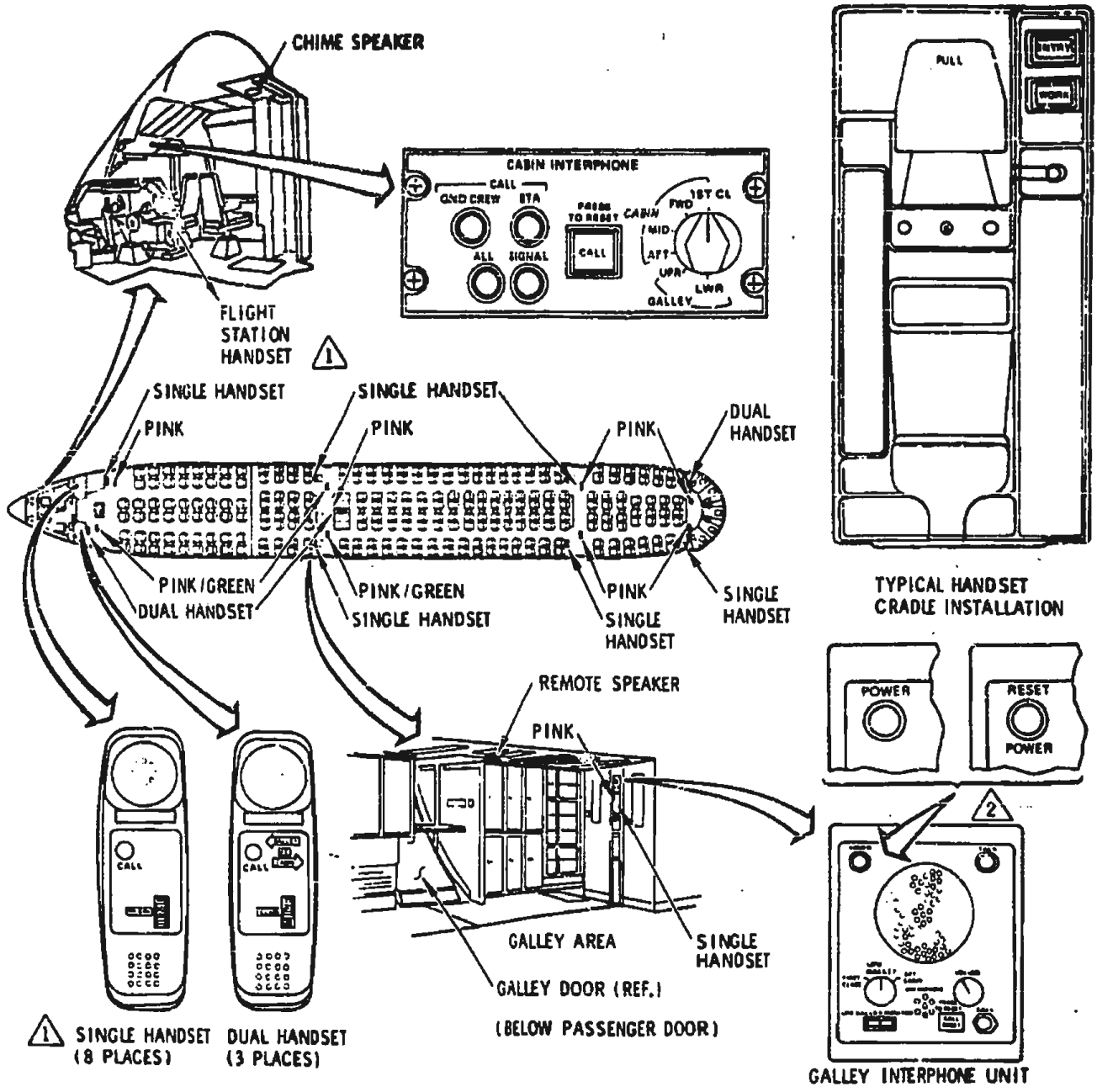
FIGURE	TITLE
108	Cabin/Galley Audio Not Available Thru Audio Select Panels
SCHEM 1	Cabin and Galley Interphone System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
AUXILIARY SPEAKER	1	LOWER GALLEY/FS 819	23-41-14
CIRCUIT BREAKERS:			
GRD SRVC BUS – CABIN GALY INTPH 2341-CB2	1	CB2/L7	*
DC BUS NO. 3 – PASS SERVICE	1	CB2/C8	*
ELECTRONIC CHIME SPEAKER	2	FLT STA, FS 235 LWR GALY	23-41-04
FLT STA CONTROL UNIT	1	PILOT OVHD PNL/P5	23-41-03
GALLEY INTERPHONE UNIT	1	LWR GALY/BETWEEN LIFTS	23-41-07
HANDSET AND CRADLE	11	FLT STA, PASS DOORS, UPPER AND LWR GALY	23-41-01

*SEE WM EQUIPMENT LIST

M1-0000-23-3513

Component Location Index
Figure 101



NOTE

1. FLIGHT STATION HANDSET DOES NOT HAVE SELECTOR SWITCH OR CALL BUTTON INSTALLED
2. TWO MODELS OF THE GALLEY INTERPHONE UNIT (GIU) ARE AVAILABLE. NORMALLY THE POWER LIGHT AND THE ILLUMINATED RESET POWER SWITCHLIGHT ARE ON WITH SYSTEM POWER APPLIED. THE GIU WITH THE RESET POWER SWITCH CONTAINS INTERNAL CURRENT AND VOLTAGE OVERLOAD PROTECTION CIRCUITRY.
3. PINK AND GREEN CALL LIGHTS LOCATED IN BASE OF EXIT SIGNS ON CEILING ABOVE EACH ATTENDANT POSITION (ONLY GREEN LIGHTS BY L1, L2, R2, AND R4 DOORS OPERATE - OTHER GREEN LIGHTS ARE NOT CONNECTED)

M1-0000-23-3603

Cabin and Galley Interphone System - Component Locator Diagram
Figure 102

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 1A15, 1A16, 2C7, 2C8

CHIMES AND CALL LIGHTS INOPERATIVE (DIAL LINE FAULT) (1)

1 IS POWER LIGHT OR RESET POWER SWITCHLIGHT OFF?
- NO → 5
- YES → 2

2 RECYCLE CB 2L7. ON UNITS WITH RESET POWER SWITCHLIGHT PRESS AND RELEASE SWITCHLIGHT. DOES POWER ON RESET POWER LIGHT COME ON?
- YES → 5
- NO → 3

3 ON UNITS WITH RESET POWER LIGHT, OPEN CB 2L7. REMOVE UNIT DUST COVER. CHECK 4 AMPERE FUSE IN CROSSBAR PROTECTION CIRCUIT. IS FUSE BLOWN?
- NO → 5
- YES → 4

4 REPLACE LOWER GALLEY INTERPHONE UNIT

5 REMOVE LOWER GALLEY ATTENDENT HANDSET AT 2341-J17. IS VOLTAGE BETWEEN PINS 5(+) AND 6(-) 75 TO 95V DC?
- NO → 8
- YES → 6

CAUTION

OPEN CB 2L7 WHEN DISCONNECTING OR CONNECTING COMPONENTS TO MAKE VOLTAGE MEASUREMENT. CLOSE CB 2L7 ONLY LONG ENOUGH TO MAKE MEASUREMENT.

NOTE

(1) THE VOLTAGE MEASURED AT THE LOWER GALLEY HANDSET MAY BE HIGHER THAN 72 TO 82 VOLTS. (I.E. APPROXIMATELY 90 VOLTS). THIS IS NOT OF CONCERN. EACH HANDSET SHOULD DROP THE VOLTAGE APPROXIMATELY 5 VOLTS AS THE CHART SEQUENCE IS FOLLOWED.

LOCATION	VOLTAGE VOLTS
1-LWR GALLEY HANDSET (1)	80 TO 95
2-L3 DOOR	67 TO 77
3-L4 DOOR	62 TO 72
4-R4 DOOR	57 TO 67
5-R3 DOOR	52 TO 62
6-UPPER GALLEY	41 TO 57
7-R2 DOOR	41 TO 51
8-L2 DOOR	36 TO 46
9-L1 DOOR	31 TO 41
10-R1 DOOR	28 TO 36

6 USE 20,000 OHM/VOLT METER WITH 450 TO 550 OHM, 20 WATT SHUNT RESISTOR TO MEASURE DIAL LINE VOLTAGE BETWEEN PINS 5(+) AND 6(-) OF EACH HANDSET CONNECTOR IN CHART LOCATIONS 1 THRU 6. USE THE SAME METER AND A 180 TO 220 OHM 20 WATT SHUNT RESISTOR TO MEASURE HANDSET DIAL LINE VOLTAGE AT CHART POSITION 7 THRU 10. MEASURE HANDSETS AT THE POSITIONS AND IN THE ORDER SHOWN ON VOLTAGE TABLE. DO VOLTAGES AGREE WITH THE VOLTAGE TABLE?
- NO → 13
- YES → 7

7 AT FLIGHT STATION CONTROL UNIT CONNECTOR J1, IS VOLTAGE BETWEEN PINS 0(+) AND 10(-) 21 TO 31V DC?
- NO → 14
- YES → 15

8 AT CONNECTOR 2341-J17, DOES SHORT CIRCUIT EXIST BETWEEN PIN 5 AND 6?
NOTE
WHEN CHECKING FOR SHORT CIRCUIT, EXTEND AND RETRACT COIL CORD AT EACH HANDSET SEVERAL TIMES.
- YES → 9
- NO → 10

9 ISOLATE AND REPAIR SHORT CIRCUIT (MM23-41-01).

10 AT CONNECTOR 2341-P19, DOES SHORT CIRCUIT EXIST BETWEEN PIN 13 AND AIRCRAFT GROUND?
NOTE
WHEN CHECKING FOR SHORT CIRCUIT, EXTEND AND RETRACT COIL CORD AT EACH HANDSET SEVERAL TIMES.
- YES → 12
- NO → 11

11 REPLACE GALLEY INTERPHONE UNIT (MM23-41-07).

12 ISOLATE AND REPAIR SHORT CIRCUIT (MM23-41-01) THEN REPLACE GALLEY INTERPHONE UNIT (MM23-41-07).

13 REPLACE HANDSET THAT DOES NOT PROVIDE CONTINUITY FOR DIAL LINE: EXAMPLE: IF THERE IS NO VOLTAGE AT R3 HANDSET, REPLACE R4 HANDSET (MM23-41-01).

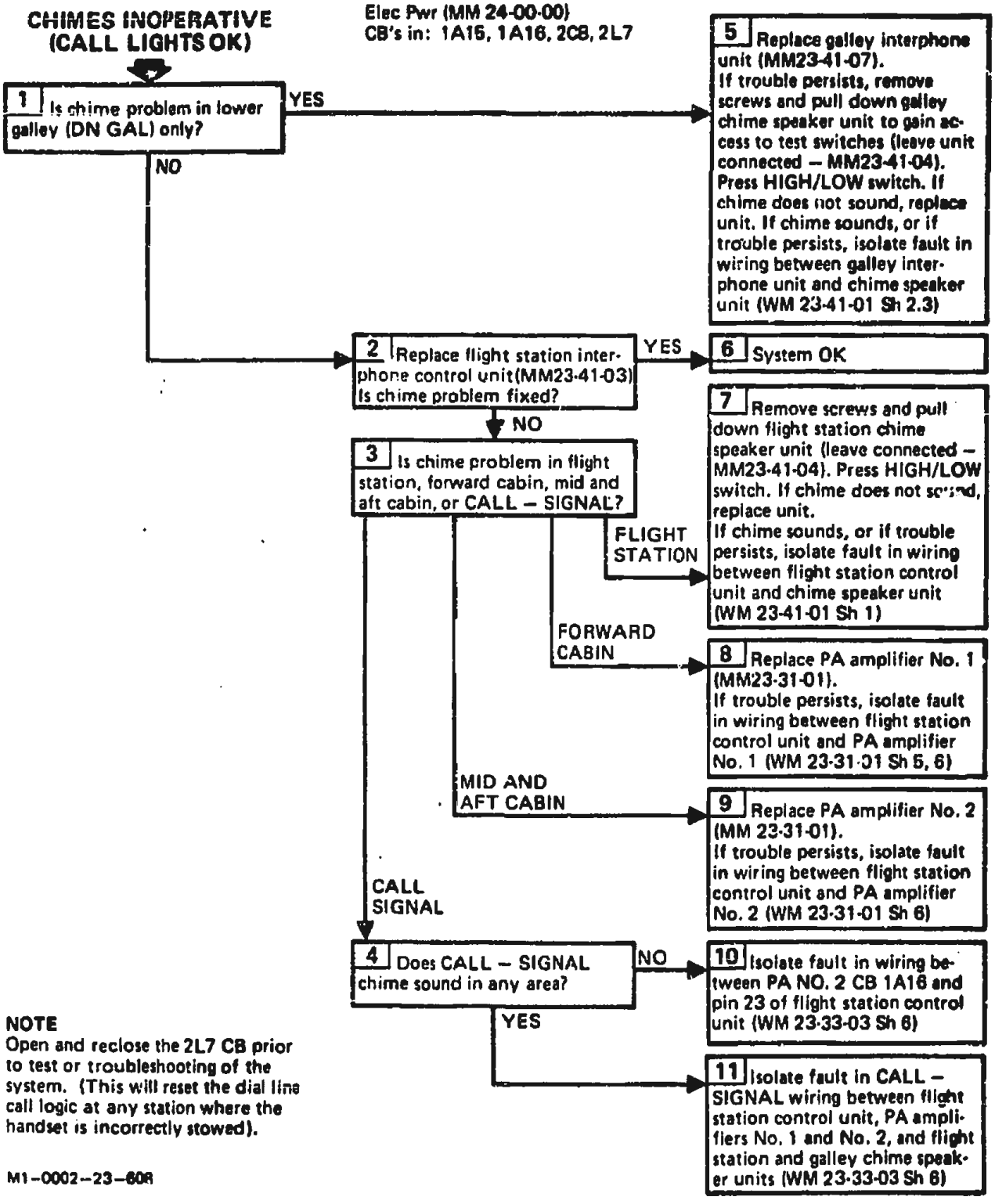
14 REPLACE R1 HANDSET (MM23-41-01).

15 REPLACE FLIGHT STATION CONTROL UNIT (MM23-41-03).

H1-0010-23-606

Chimes and Call Lights Inoperative (Dial Line Fault)
Figure 103

PREREQUISITES
Elec Pwr (MM 24-00-00)
CB's in: 1A15, 1A16, 2C8, 2L7


CHIMES INOPERATIVE (CALL LIGHTS OK)
1 Is chime problem in lower galley (DN GAL) only?
YES
NO
5 Replace galley interphone unit (MM23-41-07). If trouble persists, remove screws and pull down galley chime speaker unit to gain access to test switches (leave unit connected – MM23-41-04). Press HIGH/LOW switch. If chime does not sound, replace unit. If chime sounds, or if trouble persists, isolate fault in wiring between galley interphone unit and chime speaker unit (WM 23-41-01 Sh 2,3)
2 Replace flight station interphone control unit (MM23-41-03) Is chime problem fixed?
YES
6 System OK
NO
3 Is chime problem in flight station, forward cabin, mid and aft cabin, or CALL – SIGNAL?
FLIGHT STATION
7 Remove screws and pull down flight station chime speaker unit (leave connected – MM23-41-04). Press HIGH/LOW switch. If chime does not sound, replace unit. If chime sounds, or if trouble persists, isolate fault in wiring between flight station control unit and chime speaker unit (WM 23-41-01 Sh 1)
FORWARD CABIN
8 Replace PA amplifier No. 1 (MM23-31-01). If trouble persists, isolate fault in wiring between flight station control unit and PA amplifier No. 1 (WM 23-31-01 Sh 5, 6)
MID AND AFT CABIN
9 Replace PA amplifier No. 2 (MM 23-31-01). If trouble persists, isolate fault in wiring between flight station control unit and PA amplifier No. 2 (WM 23-31-01 Sh 6)
CALL SIGNAL
4 Does CALL – SIGNAL chime sound in any area?
NO
10 Isolate fault in wiring between PA NO. 2 CB 1A16 and pin 23 of flight station control unit (WM 23-33-03 Sh 6)
YES
11 Isolate fault in CALL – SIGNAL wiring between flight station control unit, PA amplifiers No. 1 and No. 2, and flight station and galley chime speaker units (WM 23-33-03 Sh 6)

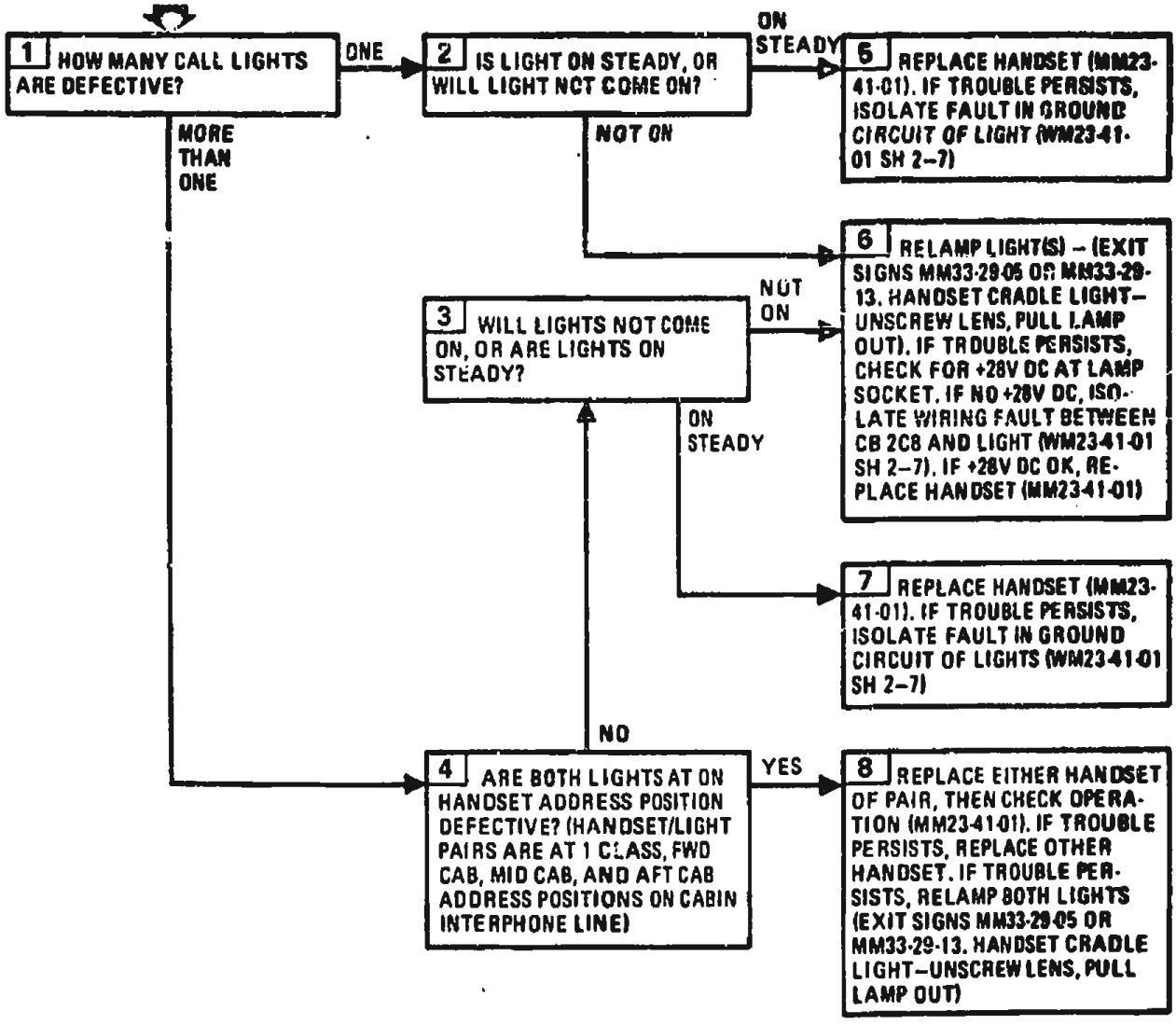
NOTE
Open and reclose the 2L7 CB prior to test or troubleshooting of the system. (This will reset the dial line call logic at any station where the handset is incorrectly stowed).

M1-0002-23-60R

Chimes Inoperative (Call Lights OK)
Figure 104

CALL LIGHTS INOPERATIVE (Chimes OK)

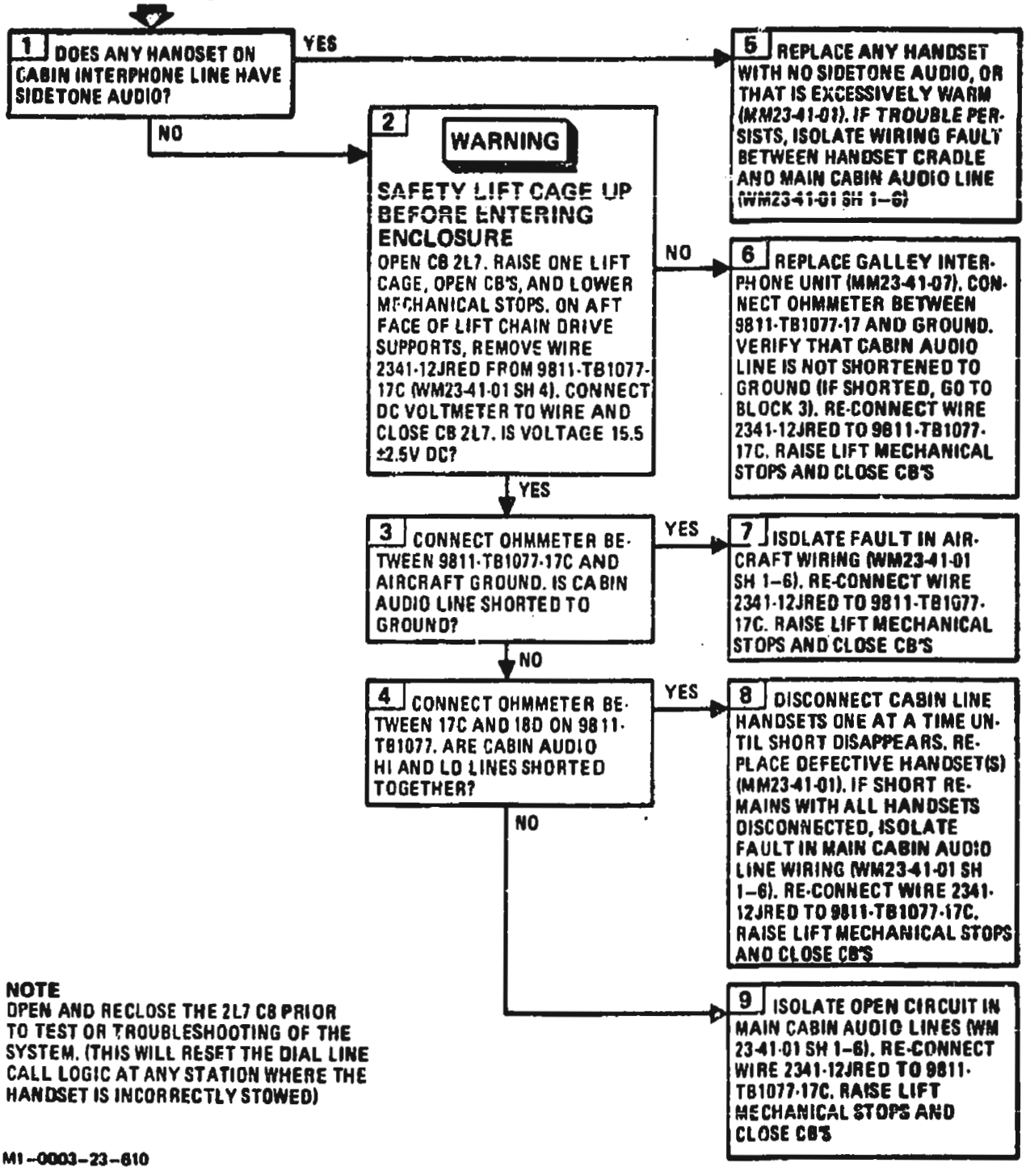
PREREQUISITES
ELEC POWER (MM24-00-00)
CB'S IN: 1A15, 1A16, 2C8, 2L7


1 HOW MANY CALL LIGHTS ARE DEFECTIVE?
ONE
MORE THAN ONE
2 IS LIGHT ON STEADY, OR WILL LIGHT NOT COME ON?
ON STEADY
NOT ON
5 REPLACE HANDSET (MM23-41-01). IF TROUBLE PERSISTS, ISOLATE FAULT IN GROUND CIRCUIT OF LIGHT (WM23-41-01 SH 2-7)
6 RELAMP LIGHT(S) – (EXIT SIGNS MM33-29-05 OR MM33-29-13, HANDSET CRADLE LIGHT–UNSCREW LENS, PULL LAMP OUT). IF TROUBLE PERSISTS, CHECK FOR +28V DC AT LAMP SOCKET. IF NO +28V DC, ISOLATE WIRING FAULT BETWEEN CB 2C8 AND LIGHT (WM23-41-01 SH 2-7). IF +28V DC OK, REPLACE HANDSET (MM23-41-01)
3 WILL LIGHTS NOT COME ON, OR ARE LIGHTS ON STEADY?
NOT ON
ON STEADY
7 REPLACE HANDSET (MM23-41-01). IF TROUBLE PERSISTS, ISOLATE FAULT IN GROUND CIRCUIT OF LIGHTS (WM23-41-01 SH 2-7)
NO
4 ARE BOTH LIGHTS AT ON HANDSET ADDRESS POSITION DEFECTIVE? (HANDSET/LIGHT PAIRS ARE AT 1 CLASS, FWD CAB, MID CAB, AND AFT CAB ADDRESS POSITIONS ON CABIN INTERPHONE LINE)
YES
8 REPLACE EITHER HANDSET OF PAIR, THEN CHECK OPERATION (MM23-41-01). IF TROUBLE PERSISTS, REPLACE OTHER HANDSET. IF TROUBLE PERSISTS, RELAMP BOTH LIGHTS (EXIT SIGNS MM33-29-05 OR MM33-29-13, HANDSET CRADLE LIGHT–UNSCREW LENS, PULL LAMP OUT)

NOTE
OPEN AND RECLOSE THE 2L7 CB PRIOR TO TEST OR TROUBLESHOOTING OF THE SYSTEM. (THIS WILL RESET THE DIAL LINE CALL LOGIC AT ANY STATION WHERE THE HANDSET IS INCORRECTLY STOWED).

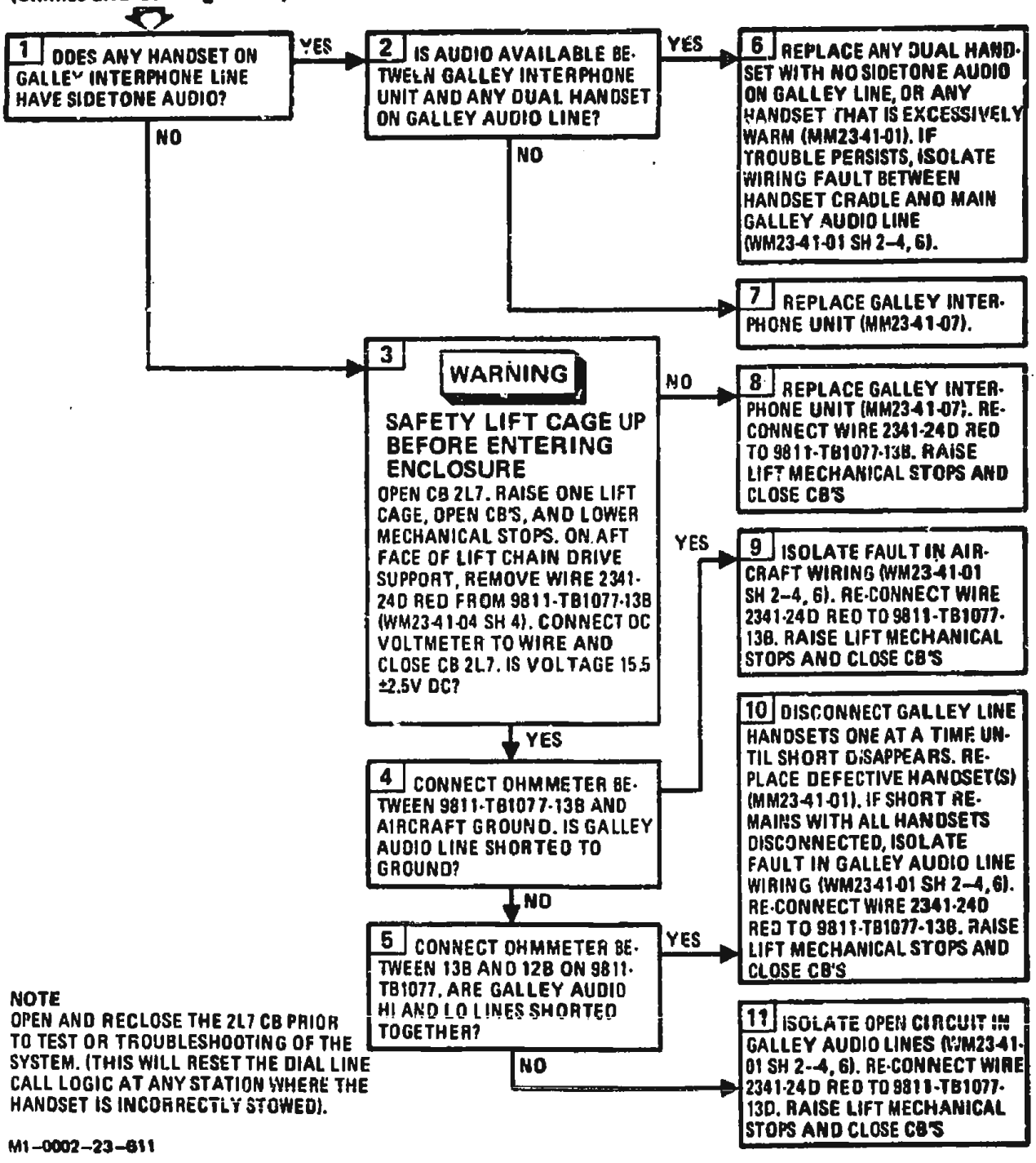
M1-0003-23-609

Call Lights Inoperative (Chimes OK)
Figure 105


CABIN INTERPHONE AUDIO DEFECT (Chimes and Call Lights OK)
PREREQUISITES
ELEC POWER (MM24-00-00)
CB'S IN: 1A15, 1A16, 2C8, 2L7
1 DOES ANY HANDSET ON CABIN INTERPHONE LINE HAVE SIDETONE AUDIO?
YES
NO
5 REPLACE ANY HANDSET WITH NO SIDETONE AUDIO, OR THAT IS EXCESSIVELY WARM (MM23-41-01). IF TROUBLE PERSISTS, ISOLATE WIRING FAULT BETWEEN HANDSET CRADLE AND MAIN CABIN AUDIO LINE (WM23-41-01 SH 1-6)
2 WARNING
SAFETY LIFT CAGE UP BEFORE ENTERING ENCLOSURE
OPEN CB 2L7. RAISE ONE LIFT CAGE, OPEN CB'S, AND LOWER MECHANICAL STOPS. ON AFT FACE OF LIFT CHAIN DRIVE SUPPORTS, REMOVE WIRE 2341-12JRED FROM 9811-TB1077-17C (WM23-41-01 SH 4). CONNECT DC VOLTMETER TO WIRE AND CLOSE CB 2L7. IS VOLTAGE 15.5 ±2.5V DC?
NO
6 REPLACE GALLEY INTERPHONE UNIT (MM23-41-07). CONNECT OHMMETER BETWEEN 9811-TB1077-17 AND GROUND. VERIFY THAT CABIN AUDIO LINE IS NOT SHORTENED TO GROUND (IF SHORTED, GO TO BLOCK 3). RE-CONNECT WIRE 2341-12JRED TO 9811-TB1077-17C. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
YES
3 CONNECT OHMMETER BETWEEN 9811-TB1077-17C AND AIRCRAFT GROUND. IS CABIN AUDIO LINE SHORTED TO GROUND?
YES
7 ISOLATE FAULT IN AIRCRAFT WIRING (WM23-41-01 SH 1-6). RE-CONNECT WIRE 2341-12JRED TO 9811-TB1077-17C. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
NO
4 CONNECT OHMMETER BETWEEN 17C AND 18D ON 9811-TB1077. ARE CABIN AUDIO HI AND LO LINES SHORTED TOGETHER?
YES
8 DISCONNECT CABIN LINE HANDSETS ONE AT A TIME UNTIL SHORT DISAPPEARS. REPLACE DEFECTIVE HANDSET(S) (MM23-41-01). IF SHORT REMAINS WITH ALL HANDSETS DISCONNECTED, ISOLATE FAULT IN MAIN CABIN AUDIO LINE WIRING (WM23-41-01 SH 1-6). RE-CONNECT WIRE 2341-12JRED TO 9811-TB1077-17C. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
NO
9 ISOLATE OPEN CIRCUIT IN MAIN CABIN AUDIO LINES (WM 23-41-01 SH 1-6). RE-CONNECT WIRE 2341-12JRED TO 9811-TB1077-17C. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
NOTE
OPEN AND RECLOSE THE 2L7 CB PRIOR TO TEST OR TROUBLESHOOTING OF THE SYSTEM. (THIS WILL RESET THE DIAL LINE CALL LOGIC AT ANY STATION WHERE THE HANDSET IS INCORRECTLY STOWED)
MI-0003-23-610

Cabin Interphone Audio Defect (Chimes and Call Lights OK)
Figure 106

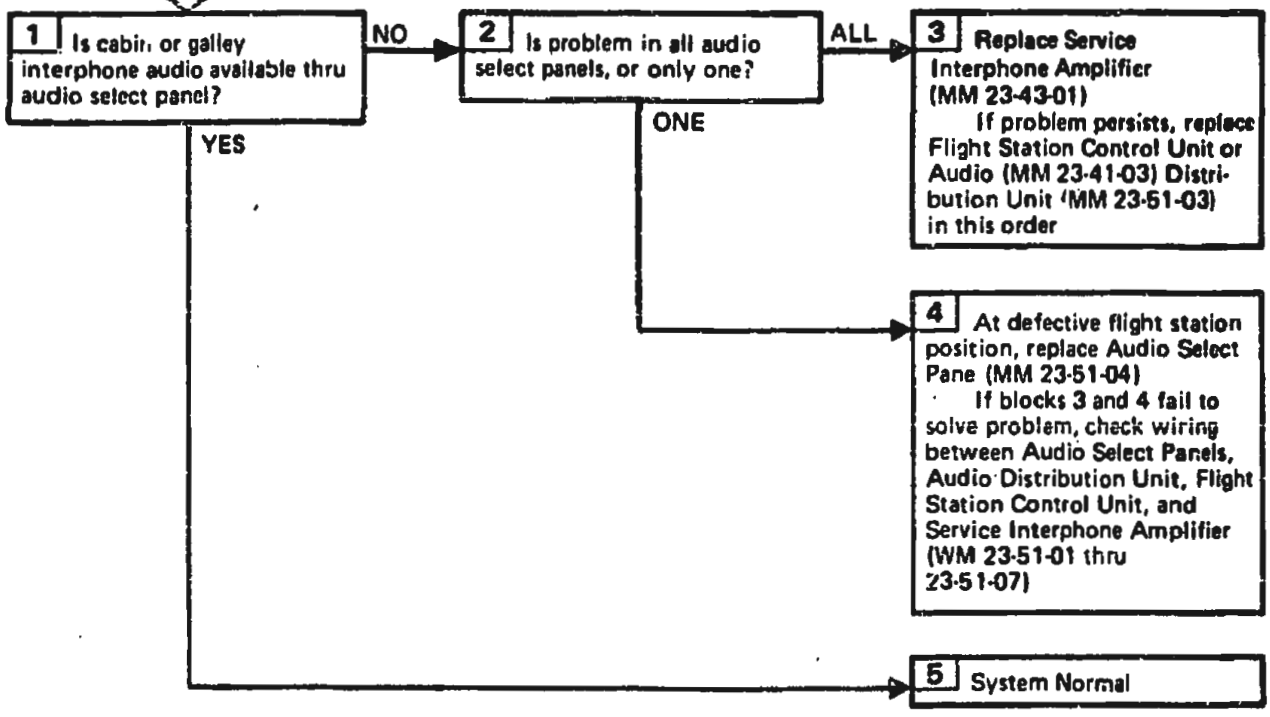
PREREQUISITES
ELEC POWER (MM24-00-00)
CB'S IN: 1A15, 1A16, 2C8, 2L7


GALLEY INTERPHONE AUDIO DEFECT (Chimes and Call Lights OK)
1 DOES ANY HANDSET ON GALLEY INTERPHONE LINE HAVE SIDETONE AUDIO?
YES
NO
2 IS AUDIO AVAILABLE BETWEEN GALLEY INTERPHONE UNIT AND ANY DUAL HANDSET ON GALLEY AUDIO LINE?
YES
NO
6 REPLACE ANY DUAL HANDSET WITH NO SIDETONE AUDIO ON GALLEY LINE, OR ANY HANDSET THAT IS EXCESSIVELY WARM (MM23-41-01). IF TROUBLE PERSISTS, ISOLATE WIRING FAULT BETWEEN HANDSET CRADLE AND MAIN GALLEY AUDIO LINE (WM23-41-01 SH 2-4, 6).
7 REPLACE GALLEY INTERPHONE UNIT (MM23-41-07).
3 WARNING
SAFETY LIFT CAGE UP BEFORE ENTERING ENCLOSURE
OPEN CB 2L7. RAISE ONE LIFT CAGE, OPEN CB'S, AND LOWER MECHANICAL STOPS. ON AFT FACE OF LIFT CHAIN DRIVE SUPPORT, REMOVE WIRE 2341-24D RED FROM 9811-TB1077-13B (WM23-41-04 SH 4). CONNECT DC VOLTMETER TO WIRE AND CLOSE CB 2L7. IS VOLTAGE 15.5 ±2.5V DC?
NO
8 REPLACE GALLEY INTERPHONE UNIT (MM23-41-07). RECONNECT WIRE 2341-24D RED TO 9811-TB1077-13B. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
YES
9 ISOLATE FAULT IN AIRCRAFT WIRING (WM23-41-01 SH 2-4, 6). RE-CONNECT WIRE 2341-24D RED TO 9811-TB1077-13B. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
4 CONNECT OHMMETER BETWEEN 9811-TB1077-13B AND AIRCRAFT GROUND. IS GALLEY AUDIO LINE SHORTED TO GROUND?
YES
NO
5 CONNECT OHMMETER BETWEEN 13B AND 12B ON 9811-TB1077. ARE GALLEY AUDIO HI AND LO LINES SHORTED TOGETHER?
YES
10 DISCONNECT GALLEY LINE HANDSETS ONE AT A TIME UNTIL SHORT DISAPPEARS. REPLACE DEFECTIVE HANDSET(S) (MM23-41-01). IF SHORT REMAINS WITH ALL HANDSETS DISCONNECTED, ISOLATE FAULT IN GALLEY AUDIO LINE WIRING (WM23-41-01 SH 2-4, 6). RE-CONNECT WIRE 2341-24D RED TO 9811-TB1077-13B. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
NO
11 ISOLATE OPEN CIRCUIT IN GALLEY AUDIO LINES (WM23-41-01 SH 2-4, 6). RE-CONNECT WIRE 2341-24D RED TO 9811-TB1077-13D. RAISE LIFT MECHANICAL STOPS AND CLOSE CB'S
NOTE
OPEN AND RECLOSE THE 2L7 CB PRIOR TO TEST OR TROUBLESHOOTING OF THE SYSTEM. (THIS WILL RESET THE DIAL LINE CALL LOGIC AT ANY STATION WHERE THE HANDSET IS INCORRECTLY STOWED).
M1-0002-23-811

Galley Interphone Audio Defect (Chimes and Call Lights OK)
Figure 107

CABIN/GALLEY AUDIO NOT AVAILABLE THRU AUDIO SELECT PANEL

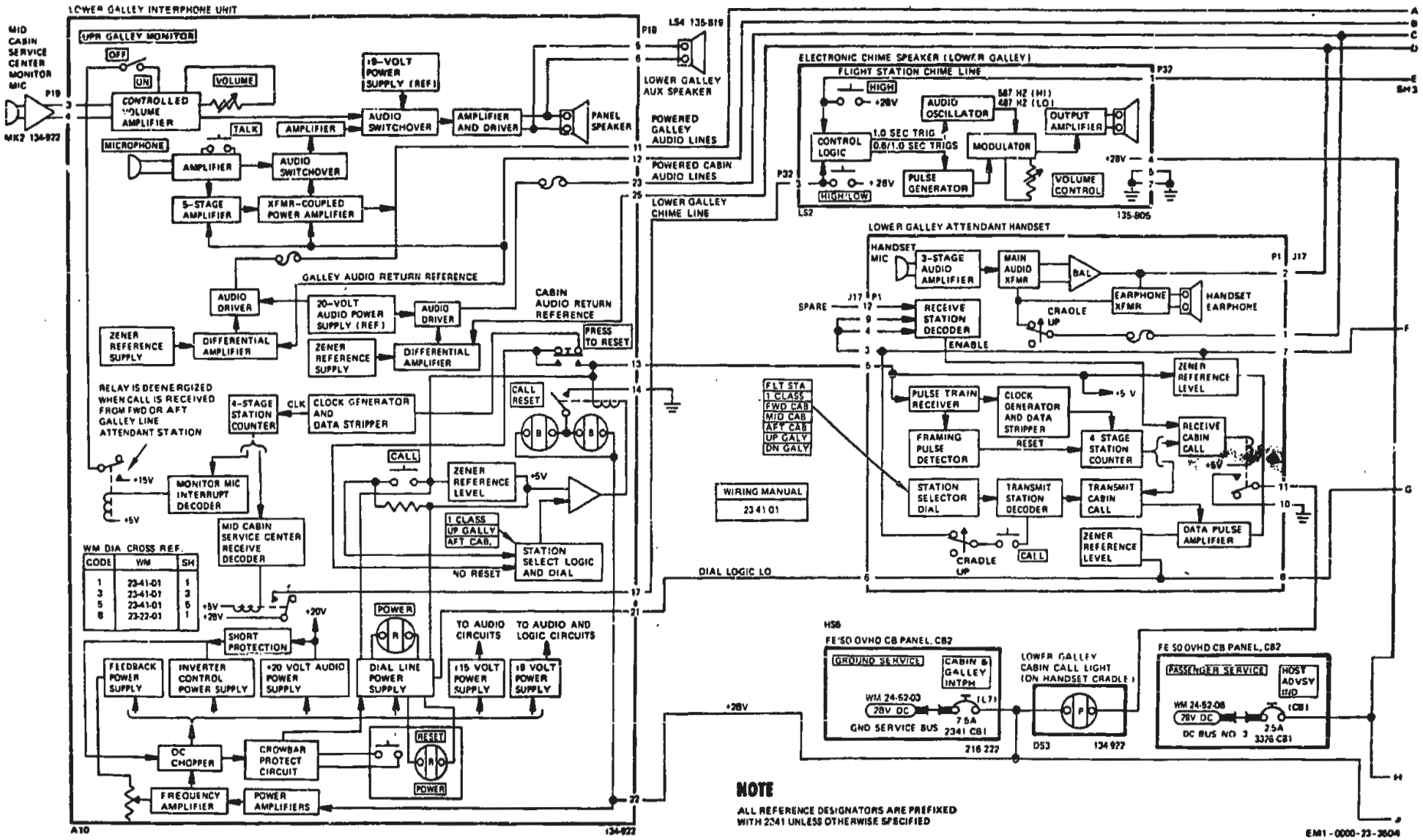
PREREQUISITES
Elect Power (MM 24-00-00)
CB's In: 1A15, 1A16, 2C8, 2L7, 1L1


1 Is cabin or galley interphone audio available thru audio select panel?
NO
2 Is problem in all audio select panels, or only one?
ALL
3 Replace Service Interphone Amplifier (MM 23-43-01)
If problem persists, replace Flight Station Control Unit or Audio (MM 23-41-03) Distribution Unit (MM 23-51-03) in this order
ONE
4 At defective flight station position, replace Audio Select Pane (MM 23-51-04)
If blocks 3 and 4 fail to solve problem, check wiring between Audio Select Panels, Audio Distribution Unit, Flight Station Control Unit, and Service Interphone Amplifier (WM 23-51-01 thru 23-51-07)
YES
5 System Normal

NOTE
Open and Reclose the 2L7 CB Prior to Test or Troubleshooting of the system. (This will reset the dial line call logic at any station where the handset is incorrectly stowed)

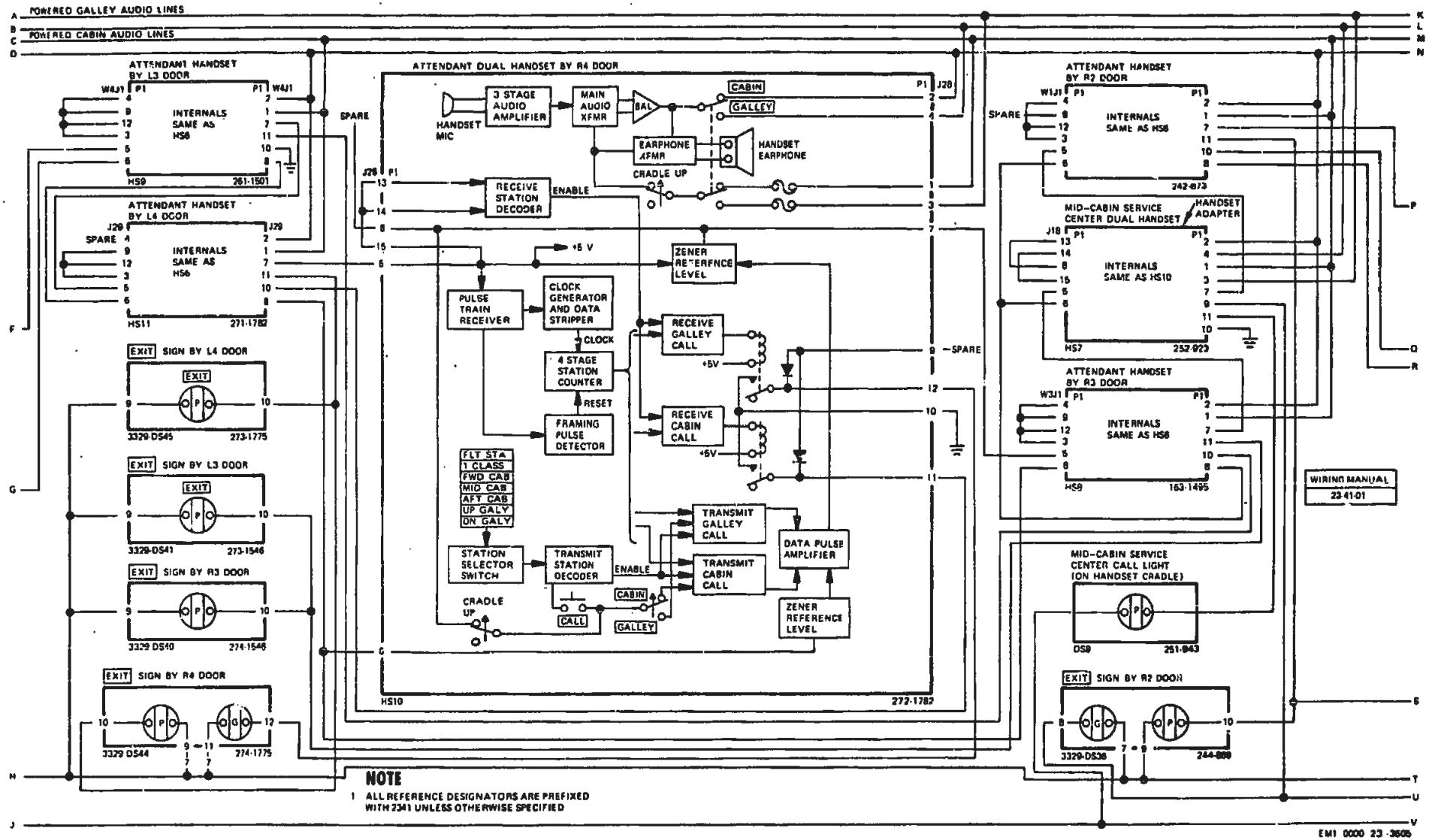
M1-0002-23-2103

Cabin/Galley Audio Not Available Thru Audio Select Panels
Figure 108



Cabin and Galley Interphone System Schematic
SCHEM 1 (Sheet 1)

EFFECTIVITY: 001-031



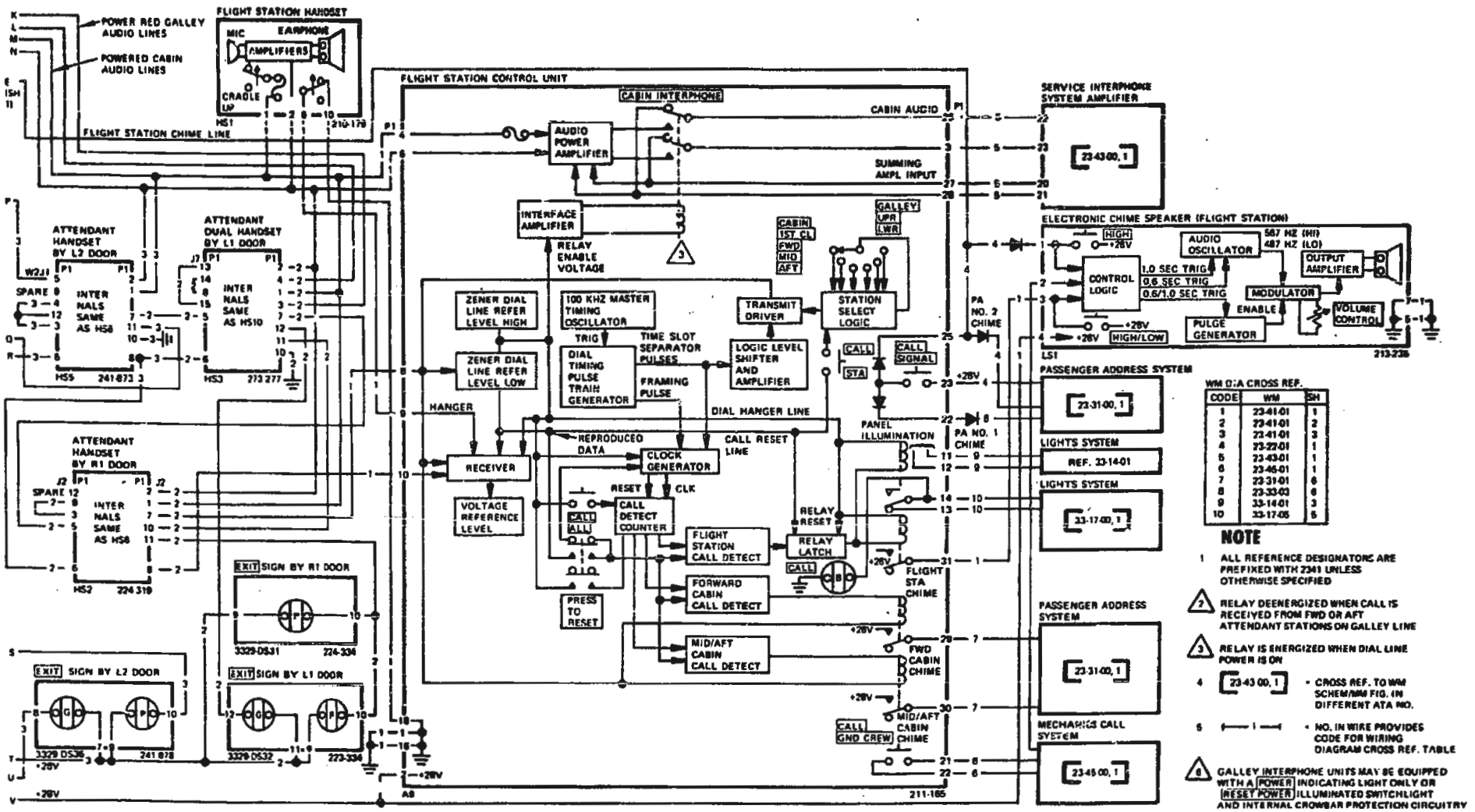
NOTE

1 ALL REFERENCE DESIGNATORS ARE PREFIXED WITH 2341 UNLESS OTHERWISE SPECIFIED

EM1 0000 23 -3608

Cabin and Galley Interphone System Schematic
SCHEM 1 (Sheet 2)

EFFECTIVITY: 001-031



R Cabin and Galley Interphone System Schematic
R SCHEM 1 (Sheet 3)

EFFECTIVITY: 001-031

CABIN INTERPHONE SYSTEM
FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, R the code number can be found in the Fault Isolation Reference R Table in the Chapter 23 Fault Code Index. The index specifies R the exact maintenance manual section, fault isolation diagram, R and block number on the diagram where the fault isolation R procedure should start. Schematics are included at the end of R the section to supplement the fault isolation diagrams or as an R aid in isolating a problem not covered on the diagrams.

Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 is a list of all Cabin Interphone fault isolation diagrams.

Cabin Interphone System Fault Isolation Diagrams
Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Cabin Lights Inoperative
104	Cabin Chimes Inoperative
105	Cabin Audio Inoperative (Chimes and Call Lights OK)
106	Cabin Audio Not Available Through Audio Select Panel
107	Lower Galley Light Inoperative

Cabin Interphone System Fault Isolation Diagrams (Cont)
Table 101

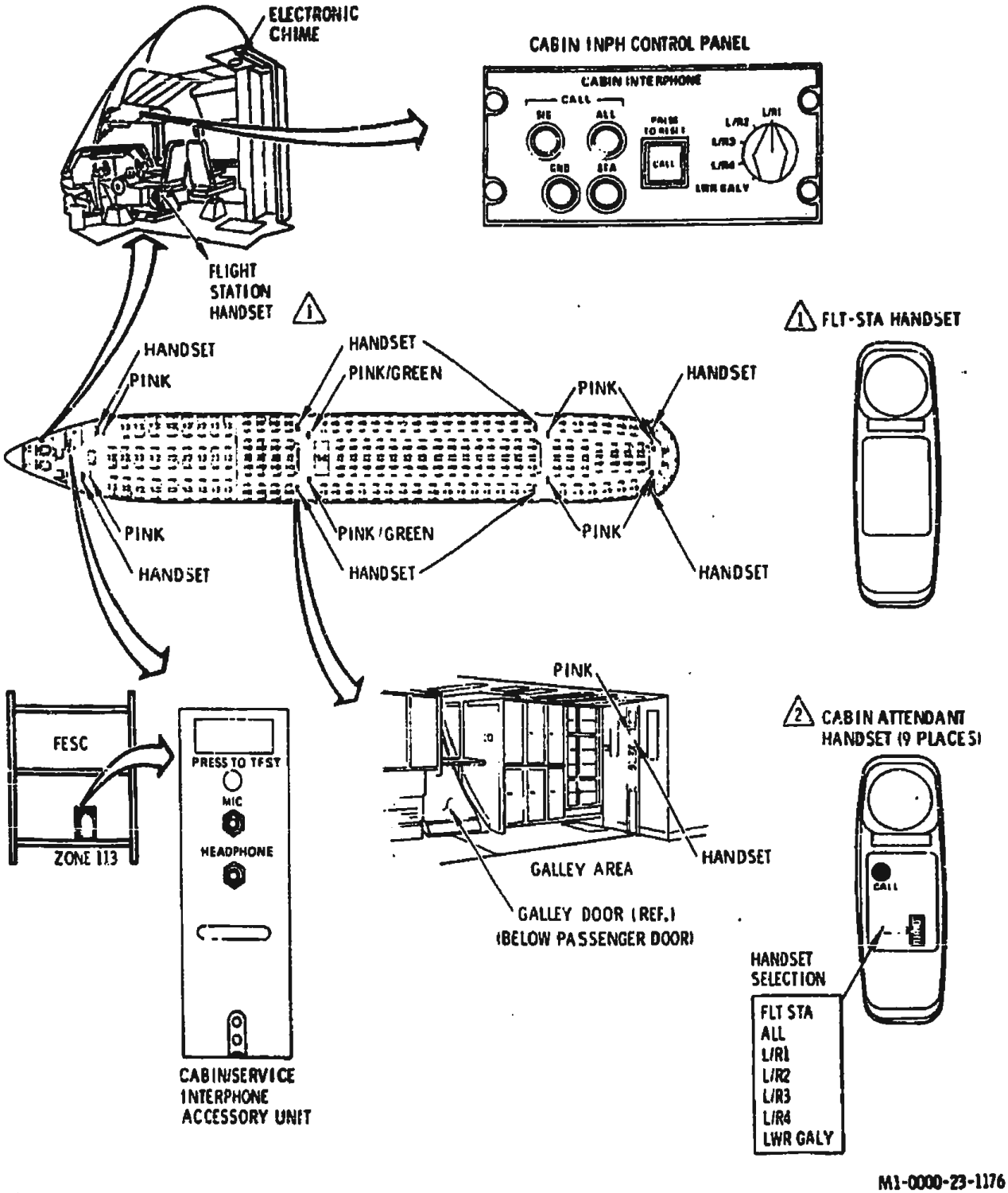
FIGURE	TITLE
108	Lower Galley Chime Inoperative
109	Galley Interphone Audio Inoperative
SCHEM 1	Cabin/Service Interphone System Schematic
SCHEM 2	Galley Interphone System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ACCESSORY UNIT	1	2110B/FESC 113	23-41-17
AUXILIARY SPEAKER	1	LOWER GALLEY/FS 819	23-41-14
CIRCUIT BREAKERS:			
GROUND SERVICE BUS – CABIN/SRVC INTPH 2341-CB2	1	CB2/L7	*
DC BUS NO. 3 – CALL SYSTEM 2341-CB2	1	CB2/D9	*
GROUND SERVICE GALLEY BUS – GALY INTPH 2341-LH LWR GALY CB PNL	1	LH LWR GALY PNL/B20	*
CONTROL UNIT	1	PILOT OVHD PNL/P5	23-41-03
ELECTRONIC CHIMES	10	FLT STA, PASS DOORS, LWR GALY	23-41-04
GALLEY INTERPHONE UNIT	1	LWR GALLEY	23-41-07
HANDSET AND CRADLE	11	FLT STA, PASS DOORS, LWR GALY	23-41-01

*SEE WM EQUIPMENT LIST

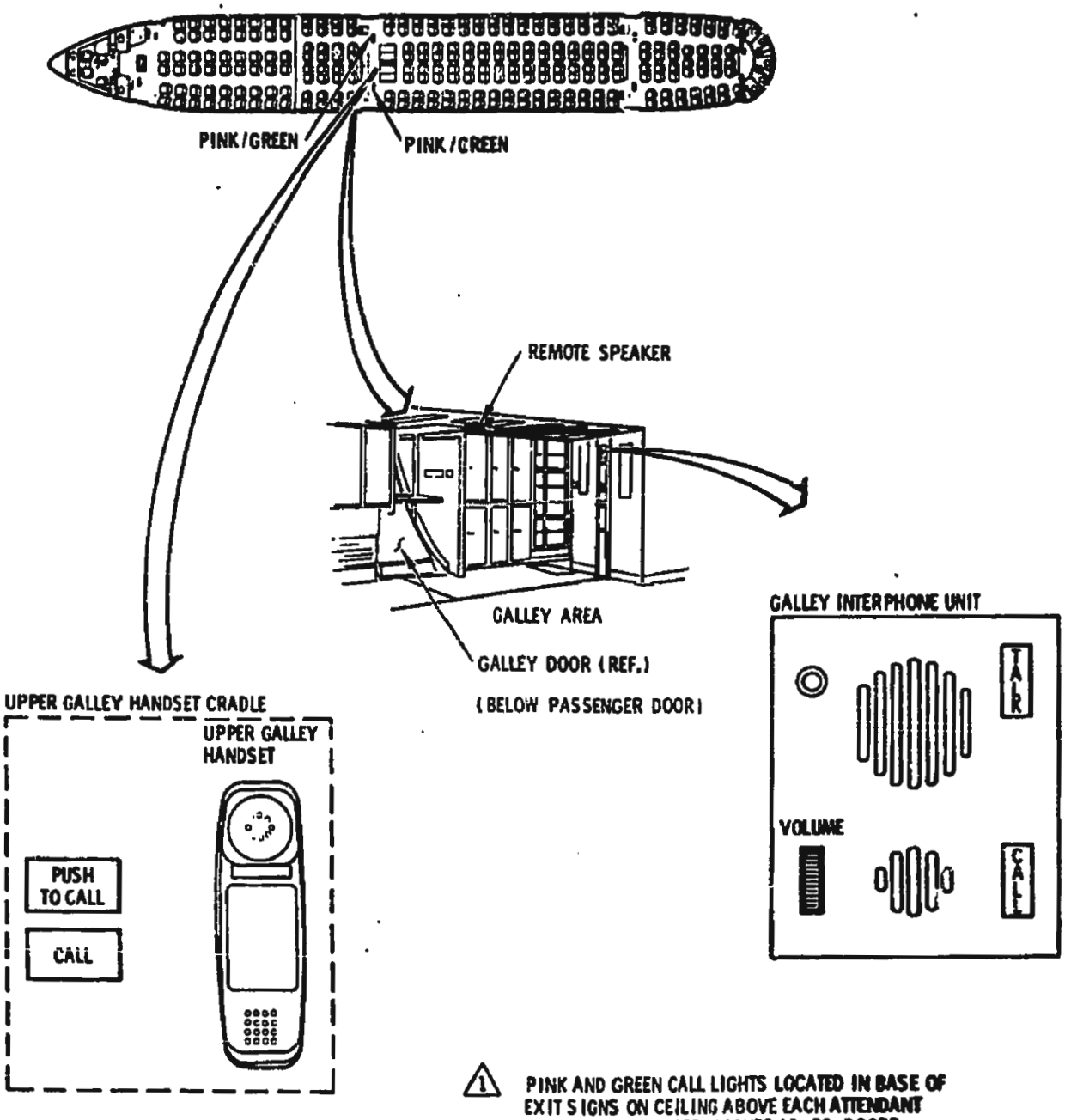
M1-0000-23-466

Component Location Index
Figure 101



M1-0000-23-1176

Component Locator Diagram
Figure 102 (Sheet 1)

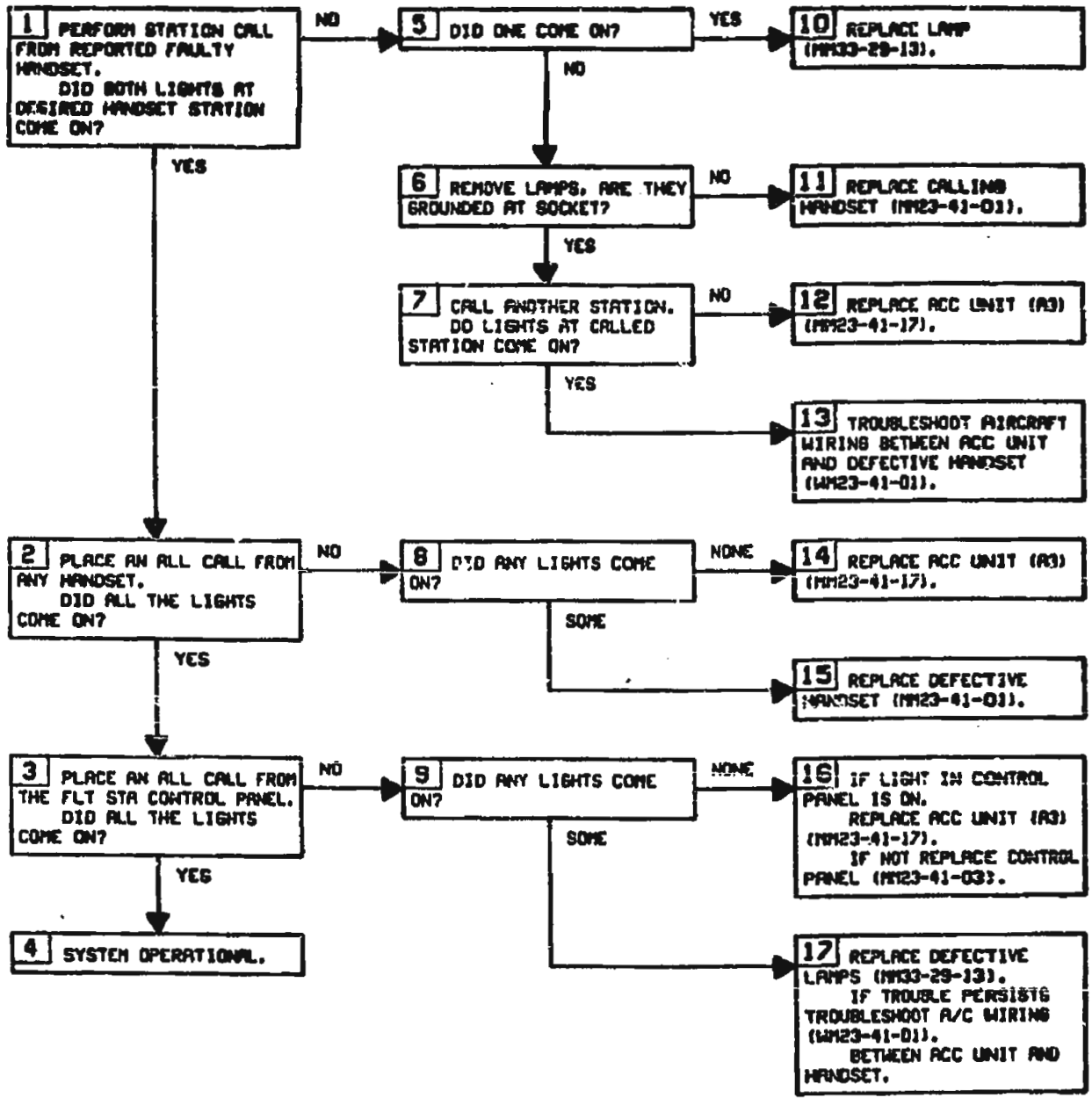


1 PINK AND GREEN CALL LIGHTS LOCATED IN BASE OF EXIT SIGNS ON CEILING ABOVE EACH ATTENDANT POSITION (ONLY GREEN LIGHTS L2, R2, DOORS OPERATE - OTHER GREEN LIGHTS ARE NOT CONNECTED)

M1-0000-23-1177

Component Locator Diagram
Figure 102 (Sheet 2)

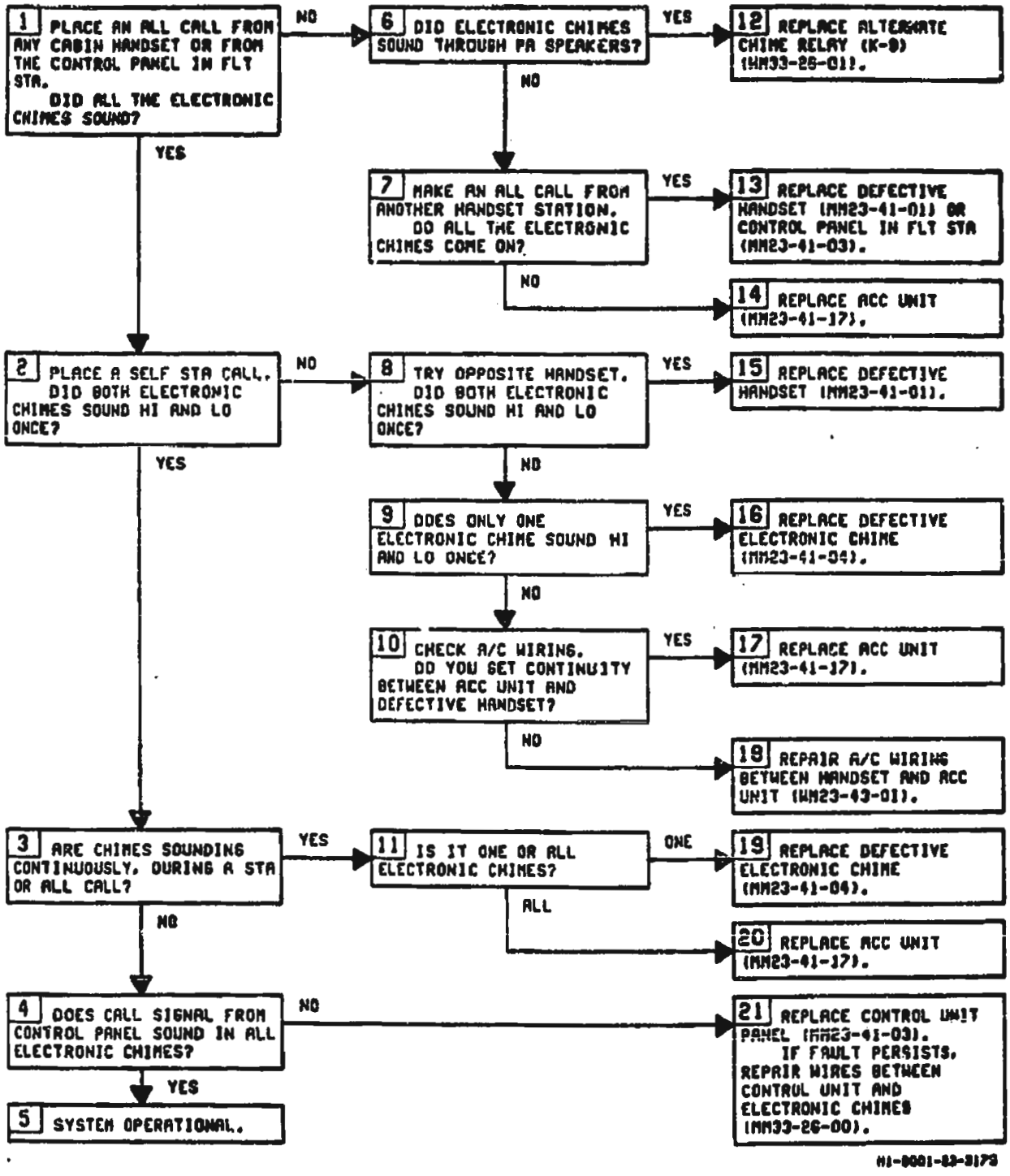
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: C82 (L7), (D8)


1 PERFORM STATION CALL FROM REPORTED FAULTY HANDSET.
DID BOTH LIGHTS AT DESIRED HANDSET STATION COME ON?
NO
YES
2 PLACE AN ALL CALL FROM ANY HANDSET.
DID ALL THE LIGHTS COME ON?
NO
YES
3 PLACE AN ALL CALL FROM THE FLT STA CONTROL PANEL.
DID ALL THE LIGHTS COME ON?
NO
YES
4 SYSTEM OPERATIONAL.
5 DID ONE COME ON?
YES
NO
10 REPLACE LAMP (MM33-29-13).
6 REMOVE LAMPS. ARE THEY GROUNDED AT SOCKET?
NO
YES
11 REPLACE CALLING HANDSET (MM23-41-01).
7 CALL ANOTHER STATION.
DO LIGHTS AT CALLED STATION COME ON?
NO
YES
12 REPLACE ACC UNIT (A3) (MM23-41-17).
13 TROUBLESHOOT AIRCRAFT WIRING BETWEEN ACC UNIT AND DEFECTIVE HANDSET (MM23-41-01).
8 DID ANY LIGHTS COME ON?
NONE
SOME
14 REPLACE ACC UNIT (A3) (MM23-41-17).
15 REPLACE DEFECTIVE HANDSET (MM23-41-01).
9 DID ANY LIGHTS COME ON?
NONE
SOME
16 IF LIGHT IN CONTROL PANEL IS ON.
REPLACE ACC UNIT (A3) (MM23-41-17).
IF NOT REPLACE CONTROL PANEL (MM23-41-03).
17 REPLACE DEFECTIVE LAMPS (MM33-29-13).
IF TROUBLE PERSISTS TROUBLESHOOT A/C WIRING (MM23-41-01).
BETWEEN ACC UNIT AND HANDSET.

M1-0001-83-3179

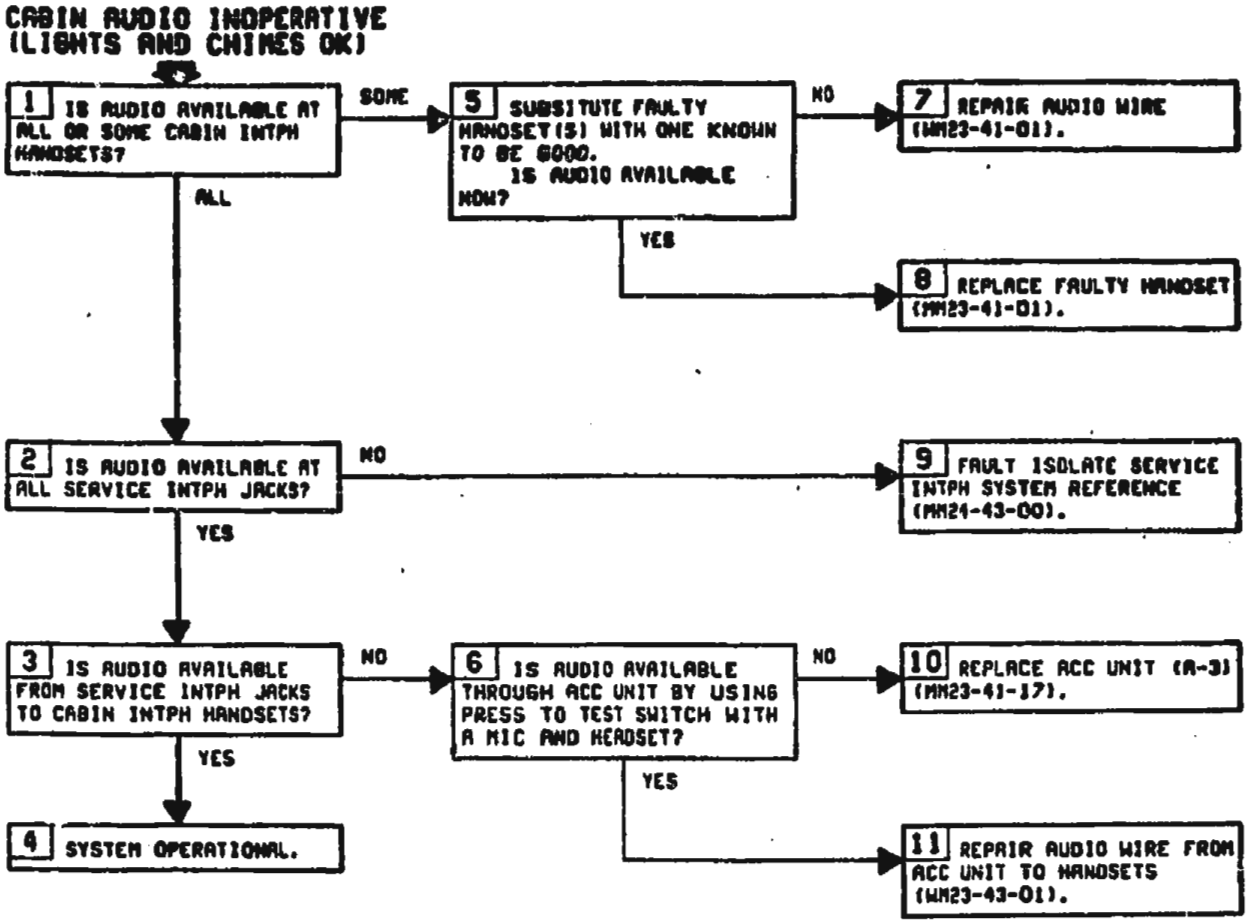
Cabin Light Inoperative
Figure 103

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: C02 (L-7), (D-8)


1 PLACE AN ALL CALL FROM ANY CABIN HANDSET OR FROM THE CONTROL PANEL IN FLT STA.
DID ALL THE ELECTRONIC CHIMES SOUND?
NO
YES
2 PLACE A SELF STA CALL.
DID BOTH ELECTRONIC CHIMES SOUND HI AND LO ONCE?
NO
YES
3 ARE CHIMES SOUNDING CONTINUOUSLY, DURING A STA OR ALL CALL?
YES
NO
4 DOES CALL SIGNAL FROM CONTROL PANEL SOUND IN ALL ELECTRONIC CHIMES?
NO
YES
5 SYSTEM OPERATIONAL.
6 DID ELECTRONIC CHIMES SOUND THROUGH PA SPEAKERS?
YES
NO
12 REPLACE ALTERNATE CHIME RELAY (K-9) (MM33-26-01).
7 MAKE AN ALL CALL FROM ANOTHER HANDSET STATION.
DO ALL THE ELECTRONIC CHIMES COME ON?
YES
NO
13 REPLACE DEFECTIVE HANDSET (MM23-41-01) OR CONTROL PANEL IN FLT STA (MM23-41-03).
14 REPLACE ACC UNIT (MM23-41-17).
8 TRY OPPOSITE HANDSET.
DID BOTH ELECTRONIC CHIMES SOUND HI AND LO ONCE?
YES
NO
15 REPLACE DEFECTIVE HANDSET (MM23-41-01).
9 DOES ONLY ONE ELECTRONIC CHIME SOUND HI AND LO ONCE?
YES
NO
16 REPLACE DEFECTIVE ELECTRONIC CHIME (MM23-41-04).
10 CHECK A/C WIRING.
DO YOU GET CONTINUITY BETWEEN ACC UNIT AND DEFECTIVE HANDSET?
YES
NO
17 REPLACE ACC UNIT (MM23-41-17).
18 REPAIR A/C WIRING BETWEEN HANDSET AND ACC UNIT (MM23-43-01).
11 IS IT ONE OR ALL ELECTRONIC CHIMES?
ONE
ALL
19 REPLACE DEFECTIVE ELECTRONIC CHIME (MM23-41-04).
20 REPLACE ACC UNIT (MM23-41-17).
21 REPLACE CONTROL UNIT PANEL (MM23-41-03).
IF FAULT PERSISTS, REPAIR WIRES BETWEEN CONTROL UNIT AND ELECTRONIC CHIMES (MM33-26-00).

Cabin Chimes Inoperative
Figure 104

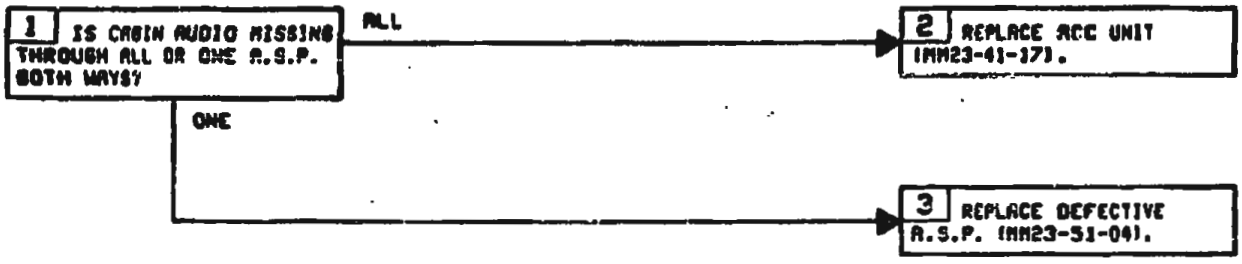
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB's INS: C02 (L-7), (D-9)


CABIN AUDIO INOPERATIVE (LIGHTS AND CHIMES OK)
1 IS AUDIO AVAILABLE AT ALL OR SOME CABIN INTPH HANDSETS?
SOME
5 SUBSITUTE FAULTY HANDSET(S) WITH ONE KNOWN TO BE GOOD. IS AUDIO AVAILABLE NOW?
NO
7 REPAIR AUDIO WIRE (MM23-41-01).
YES
8 REPLACE FAULTY HANDSET (MM23-41-01).
ALL
2 IS AUDIO AVAILABLE AT ALL SERVICE INTPH JACKS?
NO
9 FAULT ISOLATE SERVICE INTPH SYSTEM REFERENCE (MM24-43-00).
YES
3 IS AUDIO AVAILABLE FROM SERVICE INTPH JACKS TO CABIN INTPH HANDSETS?
NO
6 IS AUDIO AVAILABLE THROUGH ACC UNIT BY USING PRESS TO TEST SWITCH WITH A MIC AND HEADSET?
NO
10 REPLACE ACC UNIT (A-3) (MM23-41-17).
YES
4 SYSTEM OPERATIONAL.
YES
11 REPAIR AUDIO WIRE FROM ACC UNIT TO HANDSETS (MM23-43-01).

M1-0031-23-3176

Cabin Audio Inoperative (Lights and Chimes OK)
Figure 105

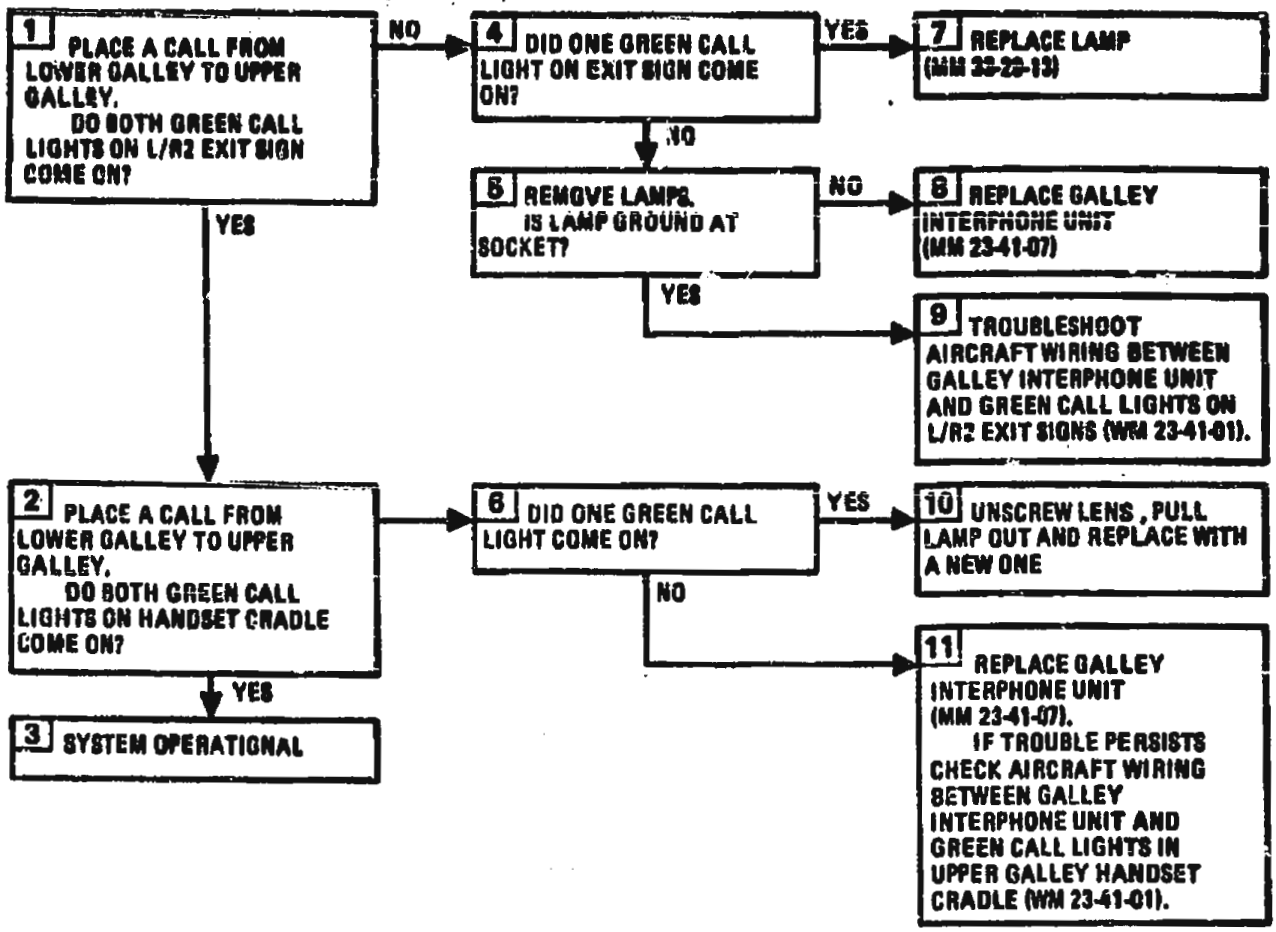
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB's IN: C82 (L-7), (Q-8)


1 IS CABIN AUDIO MISSING THROUGH ALL OR ONE A.S.P. BOTH WAYS?
ALL
2 REPLACE ACC UNIT (MM23-41-17).
ONE
3 REPLACE DEFECTIVE A.S.P. (MM23-51-04).

M1-0001-83-2177

Cabin Audio Not Available Through Audio Select Panels
Figure 106

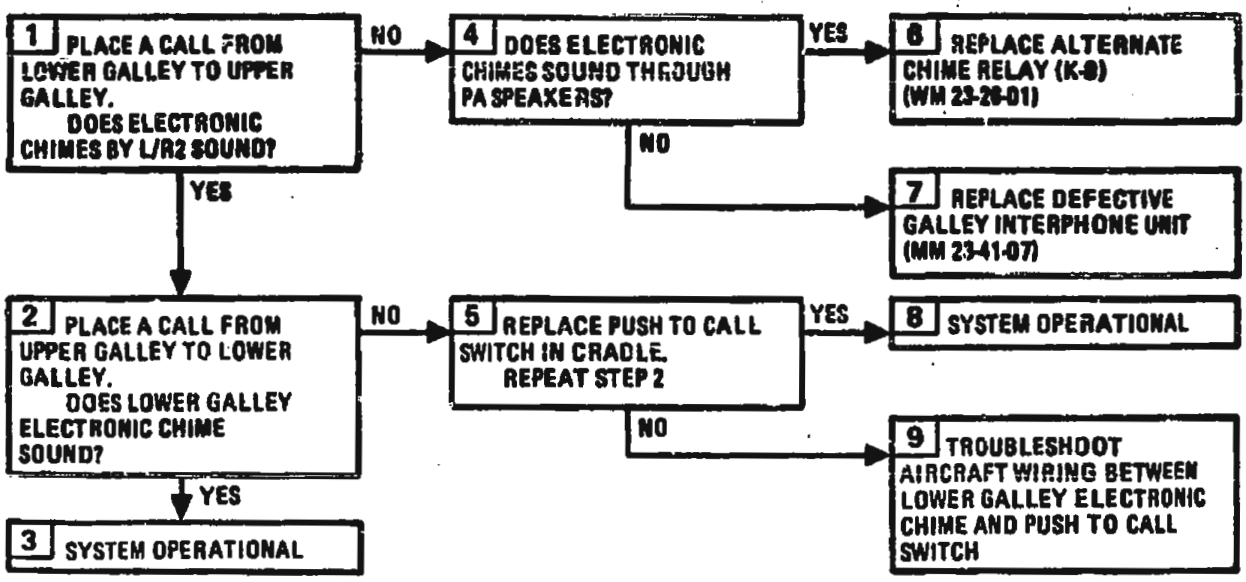
PREREQUISITES
ELECT PWR (MM 24-00-00)
CB'S (N: 208, LH LWR GALLEY B-20


1 PLACE A CALL FROM LOWER GALLEY TO UPPER GALLEY.
DO BOTH GREEN CALL LIGHTS ON L/R2 EXIT SIGN COME ON?
NO
YES
2 PLACE A CALL FROM LOWER GALLEY TO UPPER GALLEY.
DO BOTH GREEN CALL LIGHTS ON HANDSET CRADLE COME ON?
YES
3 SYSTEM OPERATIONAL
4 DID ONE GREEN CALL LIGHT ON EXIT SIGN COME ON?
YES
7 REPLACE LAMP (MM 33-20-13)
NO
5 REMOVE LAMP& IS LAMP GROUND AT SOCKET?
NO
8 REPLACE GALLEY INTERPHONE UNIT (MM 23-41-07)
YES
9 TROUBLESHOOT AIRCRAFT WIRING BETWEEN GALLEY INTERPHONE UNIT AND GREEN CALL LIGHTS ON L/R2 EXIT SIGNS (WM 23-41-01).
6 DID ONE GREEN CALL LIGHT COME ON?
YES
10 UNSCREW LENS , PULL LAMP OUT AND REPLACE WITH A NEW ONE
NO
11 REPLACE GALLEY INTERPHONE UNIT (MM 23-41-07).
IF TROUBLE PERSISTS CHECK AIRCRAFT WIRING BETWEEN GALLEY INTERPHONE UNIT AND GREEN CALL LIGHTS IN UPPER GALLEY HANDSET CRADLE (WM 23-41-01).

M1-0000-23-485

Lower Galley Light Inoperative
Figure 107

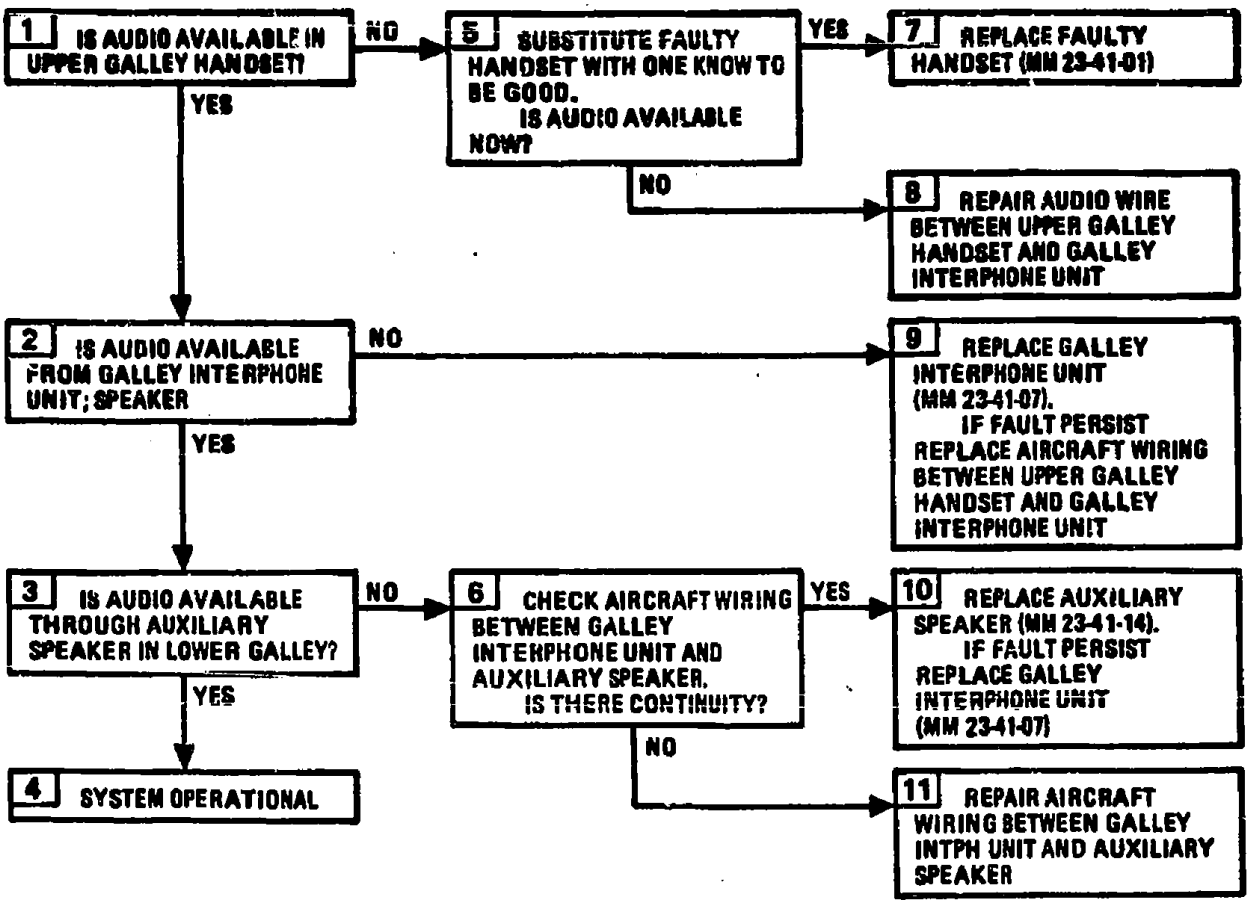
PREREQUISITES
ELECT PWR (MM 24-00-00)
CB'S IN: 2D8, GALLEY LEFT 2D8


1 PLACE A CALL FROM LOWER GALLEY TO UPPER GALLEY.
DOES ELECTRONIC CHIMES BY L/R2 SOUND?
NO
4 DOES ELECTRONIC CHIMES SOUND THROUGH PA SPEAKERS?
YES
6 REPLACE ALTERNATE CHIME RELAY (K-8) (WM 23-26-01)
NO
7 REPLACE DEFECTIVE GALLEY INTERPHONE UNIT (MM 23-41-07)
YES
2 PLACE A CALL FROM UPPER GALLEY TO LOWER GALLEY.
DOES LOWER GALLEY ELECTRONIC CHIME SOUND?
NO
5 REPLACE PUSH TO CALL SWITCH IN CRADLE.
REPEAT STEP 2
YES
8 SYSTEM OPERATIONAL
NO
9 TROUBLESHOOT AIRCRAFT WIRING BETWEEN LOWER GALLEY ELECTRONIC CHIME AND PUSH TO CALL SWITCH
YES
3 SYSTEM OPERATIONAL

M1 0000-23 2328

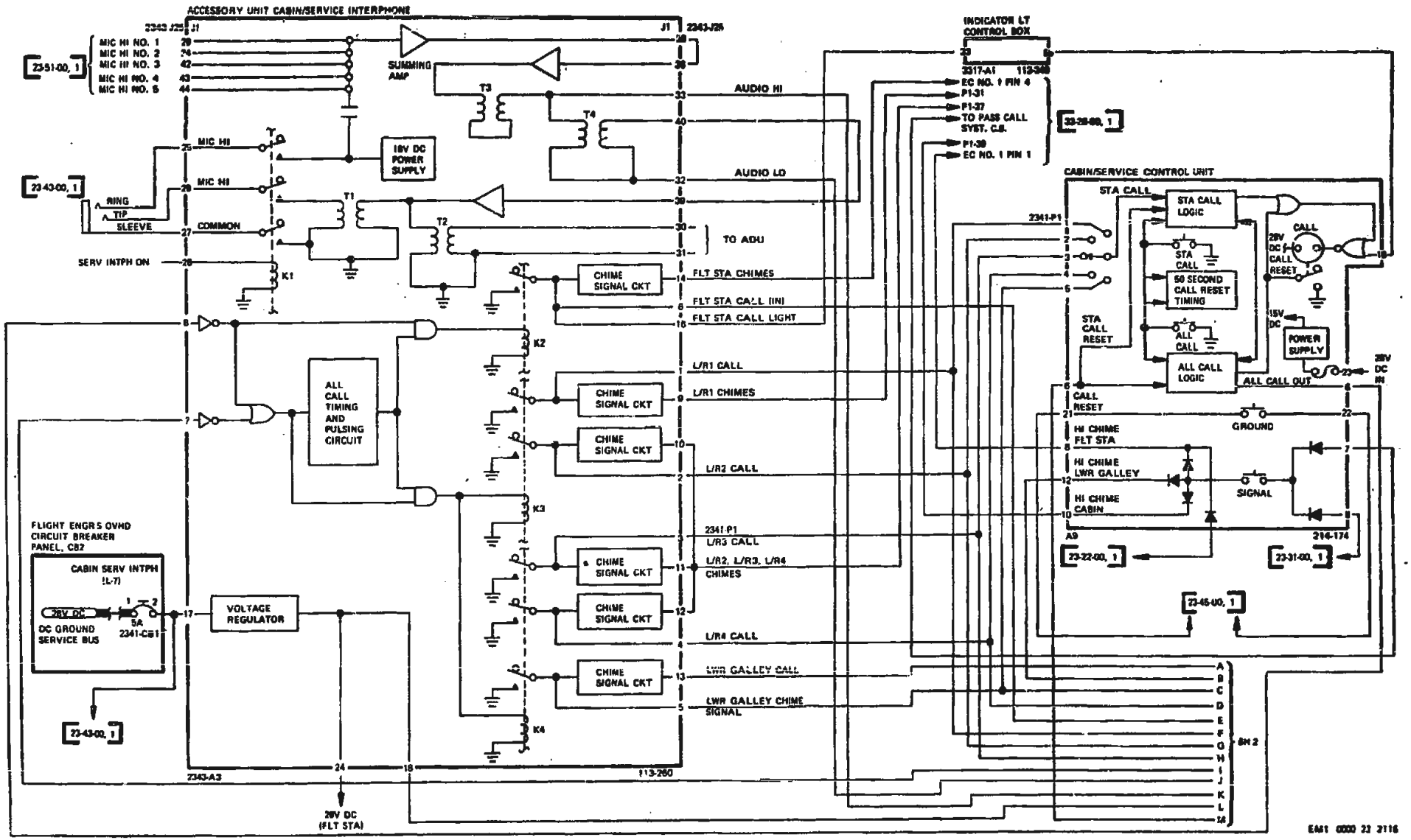
Lower Galley Chime Inoperative
Figure 108

PREREQUISITES
ELECT PWR (MM 24-00-00)
CB'S: 2D8, LEFT HAND LWR GALLEY 20-8


1 IS AUDIO AVAILABLE IN UPPER GALLEY HANDSET?
NO
5 SUBSTITUTE FAULTY HANDSET WITH ONE KNOW TO BE GOOD. IS AUDIO AVAILABLE NOW?
YES
7 REPLACE FAULTY HANDSET (MM 23-41-01)
NO
8 REPAIR AUDIO WIRE BETWEEN UPPER GALLEY HANDSET AND GALLEY INTERPHONE UNIT
YES
2 IS AUDIO AVAILABLE FROM GALLEY INTERPHONE UNIT; SPEAKER
NO
9 REPLACE GALLEY INTERPHONE UNIT (MM 23-41-07). IF FAULT PERSIST REPLACE AIRCRAFT WIRING BETWEEN UPPER GALLEY HANDSET AND GALLEY INTERPHONE UNIT
YES
3 IS AUDIO AVAILABLE THROUGH AUXILIARY SPEAKER IN LOWER GALLEY?
NO
6 CHECK AIRCRAFT WIRING BETWEEN GALLEY INTERPHONE UNIT AND AUXILIARY SPEAKER. IS THERE CONTINUITY?
YES
10 REPLACE AUXILIARY SPEAKER (MM 23-41-14). IF FAULT PERSIST REPLACE GALLEY INTERPHONE UNIT (MM 23-41-07)
NO
11 REPAIR AIRCRAFT WIRING BETWEEN GALLEY INTPH UNIT AND AUXILIARY SPEAKER
YES
4 SYSTEM OPERATIONAL

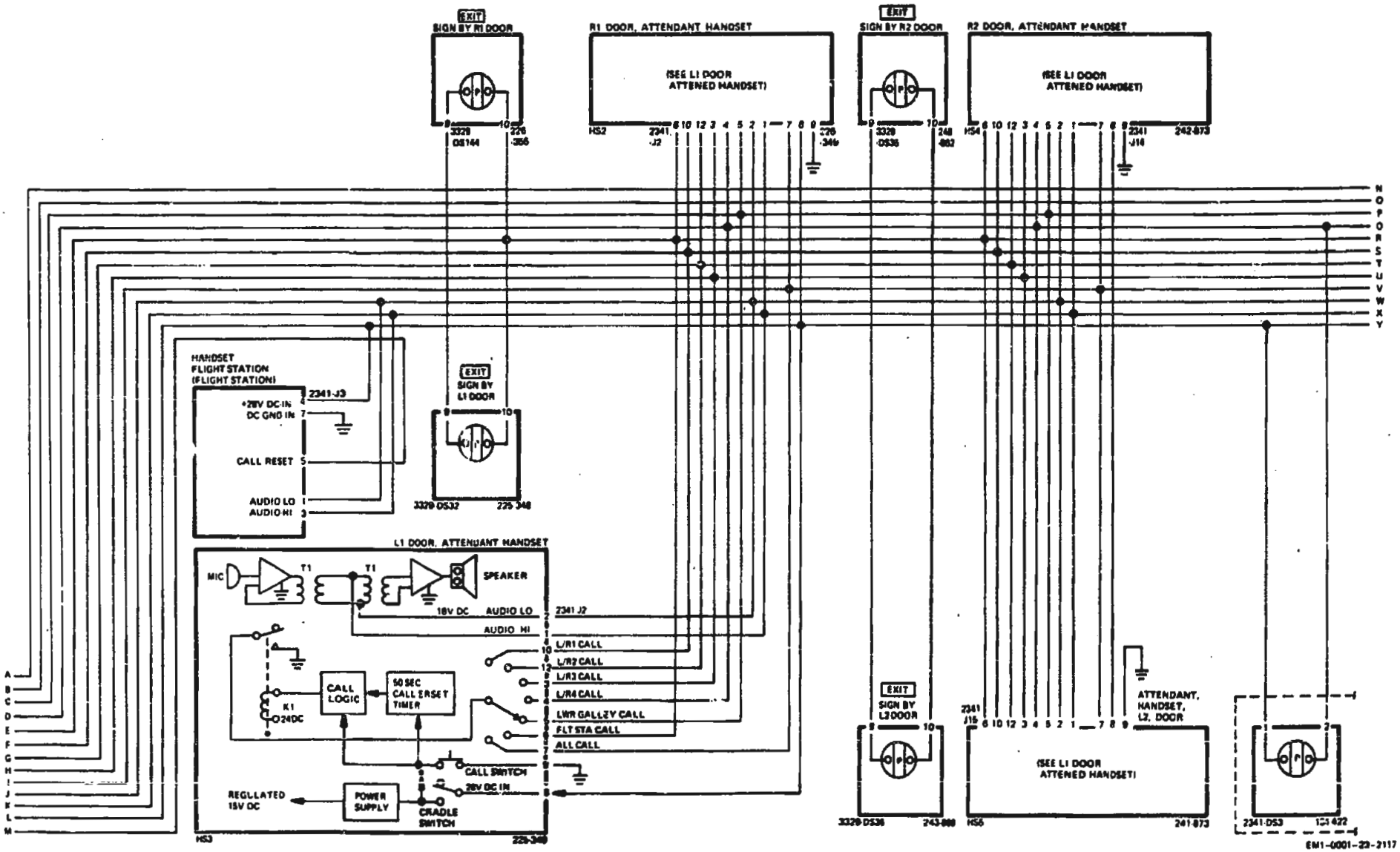
M1-0000-23-464

Galley Interphone Audio Inoperative
Figure 109



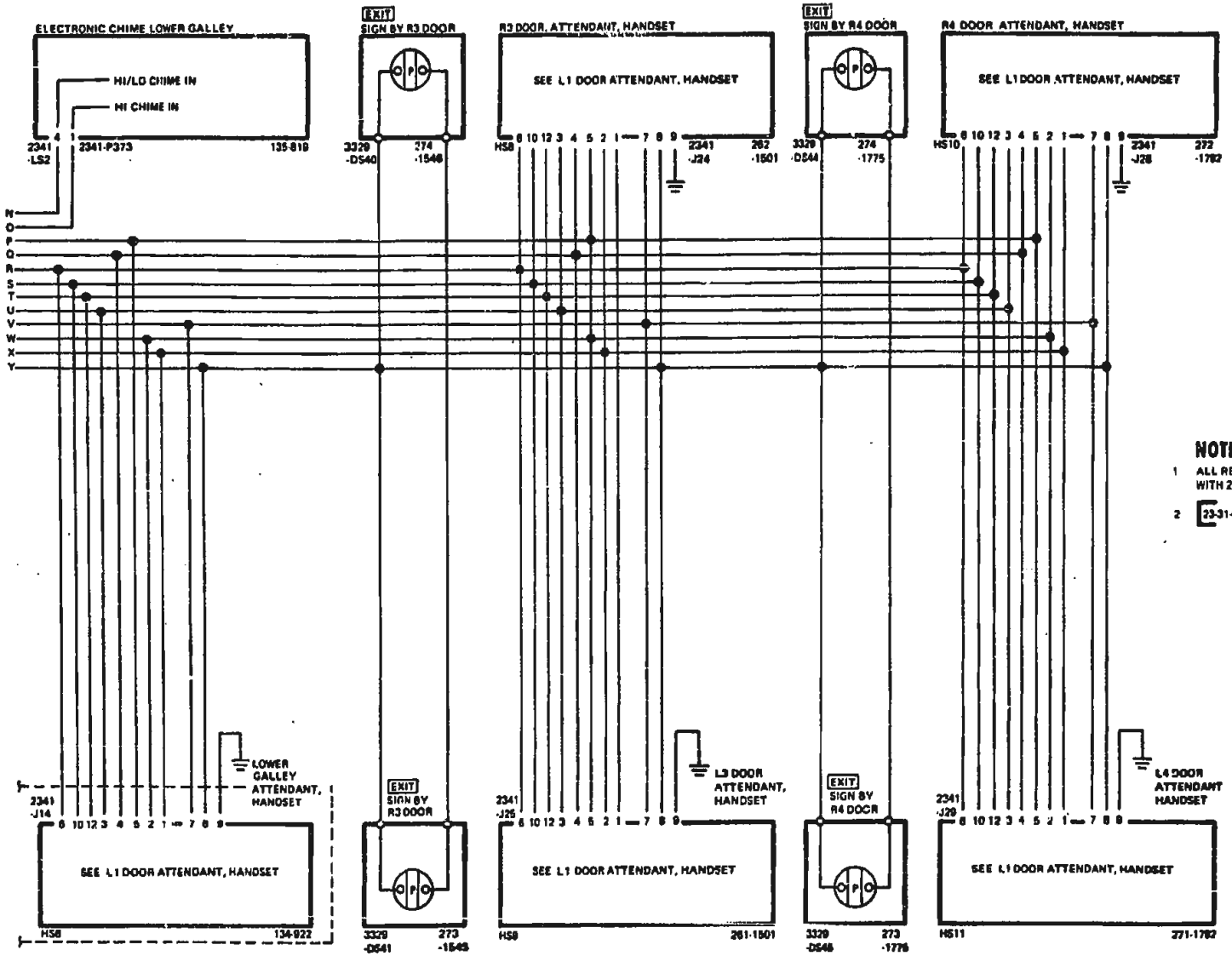
Cabin Interphone System Schematic
SCHEM 1 (Sheet 1)

R EFFECTIVITY: 032-999
R
0028



R Cabin/Service Interphone System Schematic
R SCHEM 1 (Sheet 2)

EFFECTIVITY: 032-999



NOTE

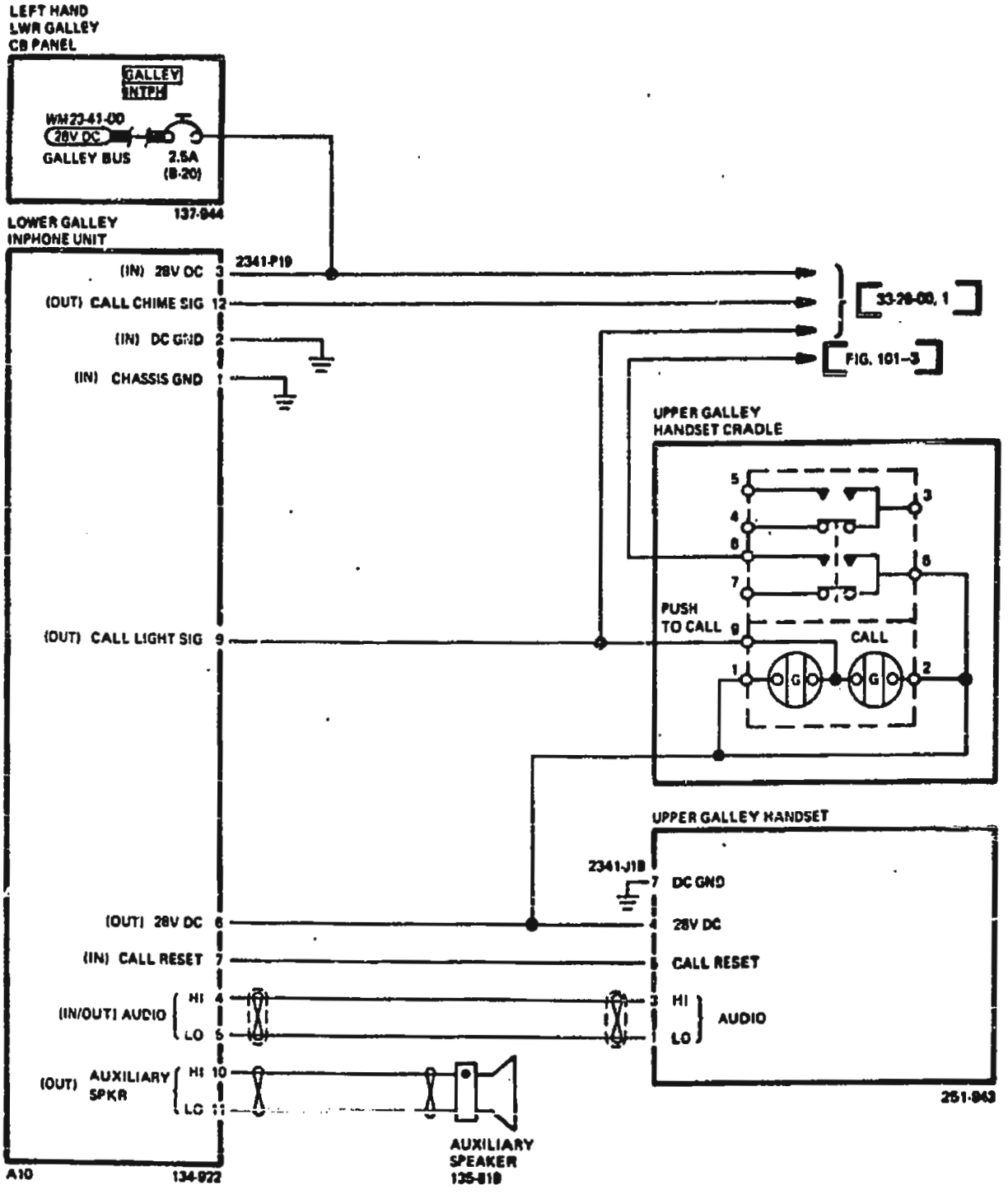
1. ALL REFERENCE DESIGNATORS ARE PREFIXED WITH 2341 UNLESS OTHERWISE SPECIFIED
2. [23-31-00, 1] = CROSS REF. TO WM SCHEM IN DIFFERENT ATA

EMI-0000-23-3614

R R Cabin/Service Interphone System Schematic
SCHEM 1 (Sheet 3)

R EFFECTIVITY: 032-999
R R R

002B



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Galley Interphone System Schematic
SCHEM 2

EFFECTIVITY: 032-999

CABIN AND GALLEY INTERPHONE SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-43-00	Service Interphone System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

R At dual handset positions, green galley call lights
R will not operate with cradle switch OFF.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, verify that circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7) are closed.

(3) Verify that passenger address (PA) system (Ref. 23-31-00), service interphone system (Ref. 23-43-00), and audio integrating system (Ref. 23-51-00) are turned on.

(4) In flight station on pilots center console, zone 210, lift and speak into interphone handset.

Verify that sidetone audio is loud and clear in handset receiver.

(5) On pilots overhead panel CABIN INTERPHONE panel, depress CALL - SIGNAL.

Verify that one Hi chime tone sounds on interphone chime speakers in flight station and lower galley and on all PA system chime speakers in passenger cabin area each time CALL - SIGNAL is depressed.

(6) On CABIN INTERPHONE panel, depress CALL - ALL. Verify the following:

HI/LO chime tones sound three times on interphone chime speakers in flight station and lower galley and on all PA system chime speakers in passenger cabin areas.

Pink call lights on all EXIT signs and handset cradles, and green call lights on EXIT signs by mid-cabin service center flash twice and come on steady.

(7) On CABIN INTERPHONE panel, depress CALL switchlight.

Verify that all pink and green lights which came on in Step (6) go off.

(8) On CABIN INTERPHONE panel, select CABIN - 1ST CL, FWD, MID, and AFT, and GALLEY - UPR, and LWR. At each position, depress CALL - STA. Verify the following:

HI/LO chime tone sounds once in lower galley and passenger cabin area (as applicable - Ref. Table 501) for each station called.

Pink (and green) call lights on EXIT signs and/or handset cradle (as applicable - Ref. Table 501) come on at each station when called.

Pink (and green) call lights go off when selector is moved to next position.

NOTE: Green call lights on EXIT signs by mid-cabin service center come on when GALLEY - UPR is called on cabin interphone line.

(9) In flight station under FE/SO table, connect handset boom MIC/headphone/handset at SERVICE INTERPHONE jack, and key microphone (SERVICE INTERPHONE switchlight must be depressed).

Verify that audio between service interphone handset and cabin and galley interphone handset is loud and clear.

(10) In flight station at any crewmember position audio selector panel, depress MIC SEL - INT and INT CABIN/SERV audio selector.

From corresponding pilots microphone and headset, verify that audio is loud and clear between flight interphone and cabin and galley interphone handset.

Return flight station handset to cradle.

NOTE: Steps (11) and (12) can be combined to check both cabin interphone and galley interphone circuits at dual handsets.

(11) At each passenger compartment attendant handset and the lower galley attendant handset, speak into handset, select each position on thumbwheel, and depress CALL (GALLEY - CABIN switch in CABIN). Verify the following:

Audio is loud and clear in handset receiver.

HI/LO chime tone sounds once in flight station, passenger cabin area, or lower galley area (as applicable - Ref. Table 501) for each station called.

Pink (and green) call lights on EXIT signs and/or handset cradle (as applicable) come on at each station (Ref.Table 501) when called.

Pink (and green) call lights go off when thumbwheel is moved to next position, or handset is returned to cradle.

(12) At dual handset positions (forward left, mid-cabin service center, and aft right), lift and speak into handset (GALLEY - CABIN switch selected to GALLEY); and select following positions on thumbwheel: 1 CLASS, UP GAL, DN GAL, and AFT CAB. At each position depress CALL and verify the following:

Audio is loud and clear in handset receiver except in the lower galley where audio is heard from both the panel and ceiling speakers.

Green call lights on EXIT signs at forward left (one light only), by mid-cabin service center (both lights), and at aft right (one light only) attendant positions come on when station is called (Ref. Table 502).

HI/LO chime tone sounds once in passenger cabin area, or lower galley area (as applicable - Ref. Table 502) for each station called.

Green light(s) go off when thumbwheel is moved to next position, GALLEY - CABIN switch is moved, or handset is returned to cradle.

(13) On lower galley interphone unit, select UPR GALLEY MONITOR to ON.

Verify that ambient noise from mid-cabin service center area can be heard on interphone unit speaker.

(14) On interphone unit, select FIRST CLASS, UPPER GALLEY, and AFT CABIN. At each position, depress CALL. Verify the following:

Green lights on EXIT signs at forward left, mid-cabin service center, aft right attendants positions come on, and blue CALL/RESET light on galley interphone unit comes on when station is called (Ref. Table 502).

HI/LO chime tone sounds once in passenger cabin area (as applicable - Ref. Table 502) for each station called.

Green light(s) go off when selector switch is moved to next position (lights stay on at last position called).

(15) On lower galley interphone unit, depress CALL RESET.

Verify that lights which stayed on in Step (14) go off.

(16) On lower galley interphone unit, select UPR GALLEY MONITOR to OFF.

Turn off service interphone system (Ref. 23-43-00) and electrical power (Ref. 24-00-00). Verify that all interphone handsets are securely stowed in their cradles.

Cabin Interphone Calls - Single and Dual Handsets
Table 501

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
FLT STA	Flight Station	Flight Station	Blue CALL light on flight station control unit
1 CLASS	Attendant seats by L1 and R1 doors	First class (PA ampl 1)	Pink call lights on EXIT signs by L1 and R1 doors
FWD CAB	Attendant seats by L2 and R2 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L2 and R2 doors
MID CAB	Attendant seats by L3 and R3 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L3 and R3 doors
AFT CAB	Attendant seats by L4 and R4 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L4 and R4 doors
UP GALY	Mid-cabin service center between lifts	Coach area (PA ampl 2)	Pink call light on handset cradle, and green call lights on EXIT signs by L2 and R2 doors
DN GALY	Lower galley between lifts (handset)	Lower galley	Pink call light on handset cradle

Galley Interphone Calls - Dual Handsets and Galley Interphone Unit
Table 502

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
1 CLASS	Attendant seat by L1 door	First class (PA ampl 1)	Green call light on EXIT sign by L1 door
AFT CAB	Attendant seat by R4 door	Coach area (PA ampl 2)	Green call light on EXIT sign by R4 door
UP GALY	Mid-cabin service center between lifts	Coach area (PA ampl 2)	Green call lights on EXIT signs by L2 and R2 doors
	NOTE: Green call lights on EXIT signs by R1, R3, L3, and L4 doors are not connected.		
DN GALY	Lower galley between lifts (galley intph unit)	Lower galley	Blue CALL/RESET light on galley interphone unit (outgoing calls only)

B. Functional Test

NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On FE/SO overhead circuit breaker panel CB2, zone 215, verify that circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7) are closed.

(3) Verify that passenger address (PA) system (Ref. 23-31-00), service interphone system (Ref. 23-43-00), and audio integrating system (Ref. 23-51-00) are turned on.

(4) In flight station on pilots overhead panel CABIN INTERPHONE panel, turn rotary switch to CABIN - 1ST CL position and depress CALL - STA. Verify the following:

Blue PRESS TO RESET - CALL light on CABIN INTERPHONE panel comes on.

PA system chime speakers in the first class area sound a HI/LO chime tone.

Pink call lights on EXIT signs by L1 and R1 doors come on (Ref. Table 501).

NOTE: Position of FIRST CLASS/COACH switches above ceiling by chime speakers at FS597 and 864 determines whether corresponding chime speakers will sound first class or coach chimes.

With INTERPHONE CHIME - CLASS DIVIDER switch (above ceiling at FS1177 by submultiplexer No. 2) positioned to FWD OF GALLEY LIFT, HI/LO chime will sound in first class area only. With switch positioned to AFT OF GALLEY LIFT, first class and coach HI/LO chime lines are connected together; calls to 1 CLASS, FWD CAB, MID CAB, AFT CAB, or UP GALY will cause chimes to sound in first class and coach area.

(5) On rear of pilots center console, lift flight station handset from cradle.

Verify that blue CALL light on CABIN INTERPHONE panel goes out.

NOTE: For following Steps (6) through (16), dual handset GALLEY - CABIN switches must be in CABIN position.

Following test steps verify that handsets can receive calls (lights and chimes) with handset in cradle; handsets must also be capable of receiving calls when not in cradle. If a handset receives a call while not in its cradle, call light will come on in normal manner, but will not go out until handset is returned to cradle.

(6) Lift handsets at attendant positions by L1 and R1 doors, and verify the following:

Pink call lights on both EXIT signs go out when either handset is lifted from cradle

Voice communication between flight station and both attendant handsets is loud and clear.

Replace flight station handset in cradle.

(7) On thumbwheels of handsets by L1 and R1 doors, select FLT STA. Depress either handset CALL button.

Verify that blue CALL light on flight station CABIN INTERPHONE panel comes on, and that flight station chime speaker sounds a HI/LO chime.

(8) Lift flight station handset from cradle.

Verify that blue CALL light on CABIN INTERPHONE panel goes off.

(9) Replace flight station handset in cradle, and depress CALL button on the other first class attendant handset.

Verify that blue CALL light on flight station CABIN INTERPHONE panel comes on, and that flight station chime speaker sounds a HI/LO chime.

(10) On CABIN INTERPHONE panel, depress CALL switchlight.

Verify that CALL light goes off.

(11) Repeat Steps 2B (4) through (10) to check cabin interphone between flight station and cabin attendants handsets as follows (Ref. Table 501):

Flight station CABIN INTERPHONE panel switch position	Corresponding attendant position - handsets and EXIT signs
CABIN - FWD	Mid cabin outboard of Service center by L2 and R2 doors
CABIN - MID AFT	Mid-aft cabin by L3 and R3 doors
CABIN - AFT	Aft cabin near lavatories by L4 and R4 doors

(12) On flight station CABIN INTERPHONE panel, depress CALL-ALL switch. Verify the following:

Pink call lights on all EXIT signs and on the mid-cabin service center handset cradle flash twice and come on steady.

Green call lights on EXIT signs by mid-cabin service center flash twice and come on steady.

Interphone chime speakers in flight station and lower galley, and all PA chime speakers in passenger compartment sound HI/LO chimes three times.

(13) On CABIN INTERPHONE panel, depress CALL switchlight.

Verify that all pink and green call lights which came on in Step (12) go off.

(14) On CABIN INTERPHONE panel, depress CALL - SIGNAL switch.

Verify that all chime speakers in flight station, lower galley, and passenger compartment sound a HI chime each time switch is depressed.

(15) In flight station at Flight Engineer/Second Officers (FE/SO) position, connect headset at SERVICE INTERPHONE jack and depress ON switchlight (Ref. 23-43-00). Key service interphone handset.

Verify that voice communication with attendant handset by L4 or R4 door is loud and clear.

(16) In flight station at any crewmember position audio selector panel, depress MIC SEL - INT and INT CABIN/SERV audio selector.

From corresponding pilots microphone and headset, verify that audio is loud and clear between flight interphone and either aft cabin attendant handset.

(17) At R4 door, select dual handset GALLEY - CABIN switch to GALLEY. Turn thumbwheel to 1 CLASS and depress CALL.

Verify that green call light on EXIT sign by L1 door comes on, and first class PA chime speakers sound HI/LO chime (Ref. Table 502).

(18) Lift dual handset by L1 door and select GALLEY - CABIN switch to GALLEY.

Verify that green light on EXIT sign goes off, and that voice communication between handsets is loud and clear.

Return handset by R4 door to cradle.

(19) On handset by L1 door, turn thumbwheel to AFT CAB and depress CALL.

Verify that green call light on EXIT sign at L4 door comes on, and coach class chime speakers sound HI/LO chime.

(20) Turn thumbwheel of attendants handset by L1 door to UP GAL and depress CALL. Verify the following:

Green call light on EXIT sign by L4 door goes off when thumbwheel is moved from AFT CAB.

Green call lights on EXIT signs outboard of mid-cabin service center (by L2 and R2 doors) come on.

Coach class chime speakers sound HI/LO chimes.

(21) On handset by L1 door, select GALLEY - CABIN switch to CABIN and depress CALL. Verify the following:

Green call lights on EXIT signs by L2 and R2 doors go off when handset is switched to CABIN.

When CALL is depressed green call lights come on again and pink call light on mid-cabin service center handset cradle comes on.

Coach class chime speakers sound HI/LO chime.

(22) Lift mid-cabin service center handset, select CABIN on GALLEY - CABIN switch, and verify the following:

Pink light on handset cradle and green lights on EXIT signs go off.

Voice communication between handsets is loud and clear.

(23) Return mid-cabin service center handset to cradle. On lower galley interphone unit, select UPR GALLEY MONITOR to ON.

Verify that ambient noise from upper galley area can be heard on lower galley interphone unit speaker.

(24) On dual handset by L1 door, select GALLEY - CABIN switch to GALLEY, turn thumbwheel to DN GAL, and depress CALL. Verify the following:

HI/LO chime sounds on lower galley chime speaker.

Upper galley ambient noise is shut off.

Voice communication is loud and clear between handset by L1 door; and lower galley interphone unit MICROPHONE, interphone unit speaker, and remote speaker.

NOTE: Lower galley interphone unit MICROPHONE must be keyed by TALK switch on lower galley interphone unit.

(25) On dual handset by L1 door, select GALLEY - CABIN switch to CABIN, and with thumbwheel set to DN GAL depress CALL.

Verify that call light on lower galley interphone handset cradle comes on, and lower galley chime speaker sounds HI/LO chime.

(26) Lift lower galley handset and verify the following:

Pink call light on lower galley attendants handset cradle goes off.

R Voice communication between galley handset and interphone handset by L1 door is loud and clear.

Return handset by L1 door to cradle.

(27) On lower galley handset, turn thumbwheel to FLT STA and depress CALL. Verify the following:

Blue CALL light on flight station CABIN INTERPHONE panel comes on.

Flight station chime speaker sounds HI/LO chime.

(28) Lift flight station handset and verify the following:

Blue CALL light goes out.

Voice communication between lower galley and flight station handsets is loud and clear.

Return both handsets to cradles.

(29) On lower galley interphone unit, select FIRST CLASS, then UPPER GALLEY, then AFT CABIN. At each position, depress CALL switch. Verify the following:

Green call lights on EXIT signs at L1 door and R4 door, and by mid-cabin service center come on when called.

HI/LO chime sounds in corresponding area chime speakers.

Green lights go out when switch on lower galley unit is moved to another position (call light stays on at last position called).

(30) On lower galley interphone unit, depress CALL RESET switchlight.

Verify that green call light left on in Step (29) goes off.

(31) On lower galley interphone unit, select UPR GALLEY MONITOR MIKE to OFF.

Turn off service interphone system (Ref. 23-43-00), and electrical power (Ref. 24-00-00).

Verify that all interphone handsets are securely stowed in their cradles.

Blue CALL light on flight station CABIN INTERPHONE panel comes on.

Flight station chime speaker sounds HI/LO chime.

(28) Lift flight station handset and verify the following:

Blue CALL light goes out.

Voice communication between lower galley and flight station handsets is loud and clear.

Return both handsets to cradles.

(29) On lower galley interphone unit, select FIRST CLASS, then UPPER GALLEY, then AFT CABIN. At each position, depress CALL switch. Verify the following:

Green call lights on EXIT signs at L1 door and R4 door, and by mid-cabin service center come on when called.

HI/LO chime sounds in corresponding area chime speakers.

Green lights go out when switch on lower galley unit is moved to another position (call light stays on at last position called).

(30) On lower galley interphone unit, depress CALL RESET switchlight.

Verify that green call light left on in Step (29) goes off.

(31) On lower galley interphone unit, select UPR GALLEY MONITOR MIKE to OFF.

Turn off service interphone system (Ref. 23-43-00), and electrical power (Ref. 24-00-00).

Verify that all interphone handsets are securely stowed in their cradles.

CABIN INTERPHONE SYSTEM -- ADJUSTMENT AND TEST

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-43-00	Service Interphone System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

NOTE: Verify that all cabin interphone handsets are properly installed and secured in cradles before starting test. Verify that switches on handset cradles are in ON position before starting test. With switch OFF, audio and dial lines are disconnected from handset (dial line is connected to zener diode in handset adapter in cradle to maintain continuity). Handset can not receive calls, but at handset pair positions (1 CLASS, FWD CAB, MID CAB, and AFT CAB), pink cabin call lights will operate unless both handsets are turned OFF. At handset pair position with both handsets turned OFF, pink cabin call lights on EXIT signs will come on and stay on. At mid cabin service center and lower galley handset positions, single pink cabin call light on handset cradle will come on and stay on with cradle switch OFF. At dual handset positions, green galley call lights will not operate with cradle switch OFF.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 130, verify that circuit breaker CABIN/SRVC INTPH (L-7) is closed. And on galley left circuit breaker, zone 130, verify that circuit breaker GALLEY INTPH (B-20) is closed.

(3) Verify that Passenger Address (PA) system (Ref. 23-31-00), Service Interphone system (Ref. 23-43-00) and Audio Intergrating system (Ref. 23-51-00) are turned on.

(4) Momentarily depress ALL switch on Cabin Interphone Control Unit (Pilot's Overhead).

(5) Verify the following:

(a) HI/LO chime sounds three (3) times from electronic chimes in Flight Station and at L1, R1, L2, R2, L3, R3, L4 and R4 door areas, and in lower galley.

(b) Blue CALL switch/light on control unit, and pink attendant advisory lights on L1, R1, L2, R2, L3, R3, L4, and R4 exit locators and on lower galley handset cradle shall illuminate on and off twice and then remain on.

(c) CALL lights illuminated in item b. extinguish after approximately 50 seconds (no measurement necessary).

(6) Remove the Flight Station handset from cradle and establish intelligible communicaton between Flight Station handset and L1, R1, L2, R2, L3, R3, L4, and R4 door attendant's handset and lower Galley handset.

(7) Momentarily depress Call switch/light on Control Unit.

Verify that lights illuminated extinguish.

(8) With Flight Station Handset removed from cradle, select L/R1 with station select switch on Control Unit. Momentarily depress STA on Control Unit.

(9) Verify the following:

(a) HI/LO chime sounds from electronic chimes in the L1 and R1 door areas.

(b) Blue CALL switch/light on control panel and pink advisory lights on L1 and R1 exit locators illuminate.

(10) Return Flight Station Handset to cradle.

(11) Verify that lights illuminated extinguish.

(12) Select L/R2 with station selector switch on Control Unit. Momentarily depress STA swich on Control Unit.

(13) Verify the following:

(a) HI/LO chime sounds from electronic chimes in L2, R2, L3, R3, L4, and R4 door areas.

(b) Blue CALL switch/light on Control Unit and pink advisory lights on L2 and R2 exit locators illuminate.

(14) Select DN GALY with station selector switch on the Control Unit.

(15) Momentarily depress STA switch on Control Unit.

(16) Verify the following:

(a) The HI/LO chime sound from electronic chime in lower Galley.

(b) The blue CALL switch/light on Control Unit and pink advisory light on lower galley handset cradle illuminate.

NOTE: Be sure no one is in immediate area of nose wheel well when performing following step.

(17) Momentarily depress GND switch on Control Unit.

(18) Verify that Mechanic's Call Horn in nose wheel well sounds each time GND switch is depressed.

(19) Momentarily depress Flight Station Call switch in nose wheel well.

R (20) Verify that low chime sounds from electronic chimes in flight station each time Flight station Call switch is depressed.

(21) Momentarily depress SIG switch on Control Unit.

(22) Verify that HI chime sounds from electronic chimes in flight station and at L1, R1, L2, R2, L3, R3, L4, and R4 door areas and in lower galley each time SIG switch is depressed.

(23) Disengage CALL SYSTEM circuit breaker (CB2 D-9).

(24) Repeat step 21.

(25) Verify that HI chime sounds from P.A. CHIME speakers in passenger's cabin and from lower galley electronic chime each time SIG switch is depressed.

(26) In flight station under FE/SO table, connect handset at SERVICE INTERPHONE jack, and key microphone (SERVICE INTERPHONE switchlight must be depressed).

(27) Verify that audio between service interphone handset and cabin interphone handset is loud and clear.

(28) In flight statin at any crew member position audio selector panel, depress MIC SEL - INT and INT CAB/SERV audio selector.

(29) From corresponding pilots microphone and headset, verify that audio is loud and clear between flight interphone and cabin interphone handset.

(30) Return flight station handset to cradle.

(31) Remove the L1 door attendant's handset from cradle. Select ALL on handset and momentarily depress Blue CALL switch.

(32) Verify the following:

(a) HI/LO chime sounds three (3) times electromic chimes at L1, R1, L2, R2, L3, R3 L4, and R4 door areas and in lower galley.

(b) The pink advisory lights on L1, R1, L2, R2, L3, R3, L4, and R4 exit locators and on lower galley handset cradle illuminate on and off twice and then remain on.

(33) Verify that ON indicator on Galley Interphone Unit (G.I.U.) is illuminated.

(34) With the upper galley handset in the cradle, momentarily depress CALL switch on the G.I.U..

(35) Verify the following:

(a) Green CALL switch/light on Upper Galley Handset illuminates.

(b) Green CALL indicators in L2 and R2 Exit Locators illuminate.

(c) HI/LO chime sounds in Coach area.

(d) Call lights illuminated in items a. and b. extinguish after approximately 50 seconds (no measurement necessary).

NOTE: If the upper galley handset is out of the cradle, the call lights in items (a) and (b) illuminate momentarily and will not remain ON.

(36) Remove upper galley handset.

(37) Verify that CALL indicators illuminated in step 35 extinguish.

(38) Momentarily depress CALL switch/light on upper galley handset cradle.

(39) Verify that HI/LO chime in lower galley sounds (each time swithc/light is depressed).

(40) Speak into upper galley handset.

(41) Verify the following:

(a) Audio sidetone in handset.

(b) Intelligible audio from G.I.U. speaker and from the G.I.U. remote speaker.

NOTE: Adjust voume control on the G.I.U. as required for adequate audio output.

(42) Depress and hold TALK switch on G.I.U. and speak into G.I.U. microphone.

(43) Verify the following:

(a) No audio is present at G.I.U. speaker.

(b) Intelligible audio is heard at upper galley handset.

HANDSET AND CRADLE - REMOVAL AND INSTALLATION

1. Referenced Procedures

20-33-03	Square Switchlight - Removal and Installation
23-31-00	Passenger Address System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
25-32-00	Galley Lift System - Adjustment and Test
33-22-00	Cabin Attendant Work Lighting - Adjustment and Test
33-24-00	Entrance Area Lighting - Adjustment and Test

2. Removal/Installation

A. Attendant Seat - Handset and Cradle Removal

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breakers LTS - BOARDING RELAY CONTROL, LTG - HOSTESS READING, and LIGHTING - BOARDING PWR.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7).

(2) At attendant seat, remove headrest and backrest cushions as follows (Ref. Fig. 401):

Remove headrest cushion by pulling out on bottom to separate Velcro fastener, then slide down to clear retaining bracket and pull cushion out.

Remove backrest cushion by pulling down seat bottom, and pulling out on backrest cushion to separate Velcro fastener.

(3) PULL handset release handle and remove handset from cradle.

R CAUTION: SUPPORT CRADLE TO PREVENT SWITCHLIGHT WIRE DAMAGE.

(4) Remove two screws under handset and two screws on bottom of cradle. Turn cradle to expose switchlight wires and handset connector. Remove wires from switchlights and tag (Ref. 20-33-03).

On aircraft 001-031:
disconnect handset connector from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp.

On aircraft 032-999:
disconnect handset adapter connector on cradle from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp, and disconnect handset connector from cradle.

B. Attendant Seat - Handset and Cradle Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) On aircraft 001-031:
slide handset cord into slot in cradle, leaving about four inches of cord between cradle and connector (enough to reach aircraft connector - Ref. Fig. 401). Install cord clamp and tighten screws. Connect handset connector.

(2) On aircraft 032-999:
Slide handset cord into slot in cradle, with the first loop of the cord against the outside of the cradle (Ref. Fig. 401). Connect handset connector to cradle, then install cord clamp and tighten screws. Connect cradle connector to aircraft connector.

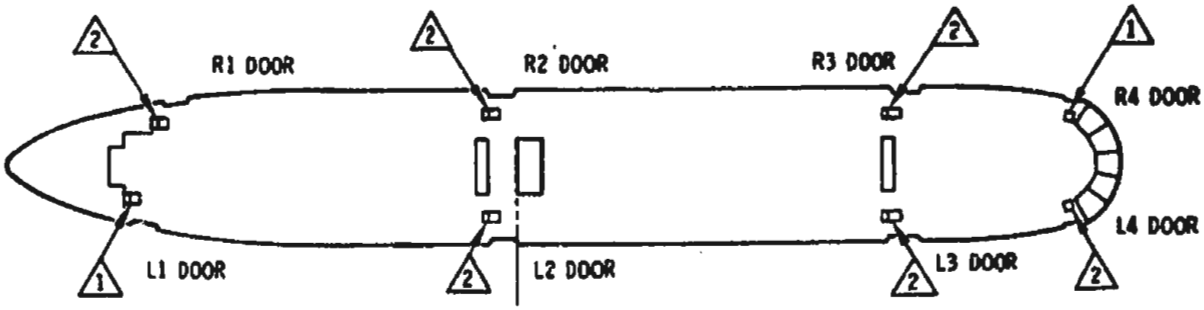
R CAUTION: SUPPORT CRADLE TO PREVENT SWITCHLIGHT WIRE DAMAGE.

(3) Insert wires into switchlights (Ref. 20-33-03). Hold cradle in position and install two screws under handset and two screws on bottom.

Insert handset into cradle.

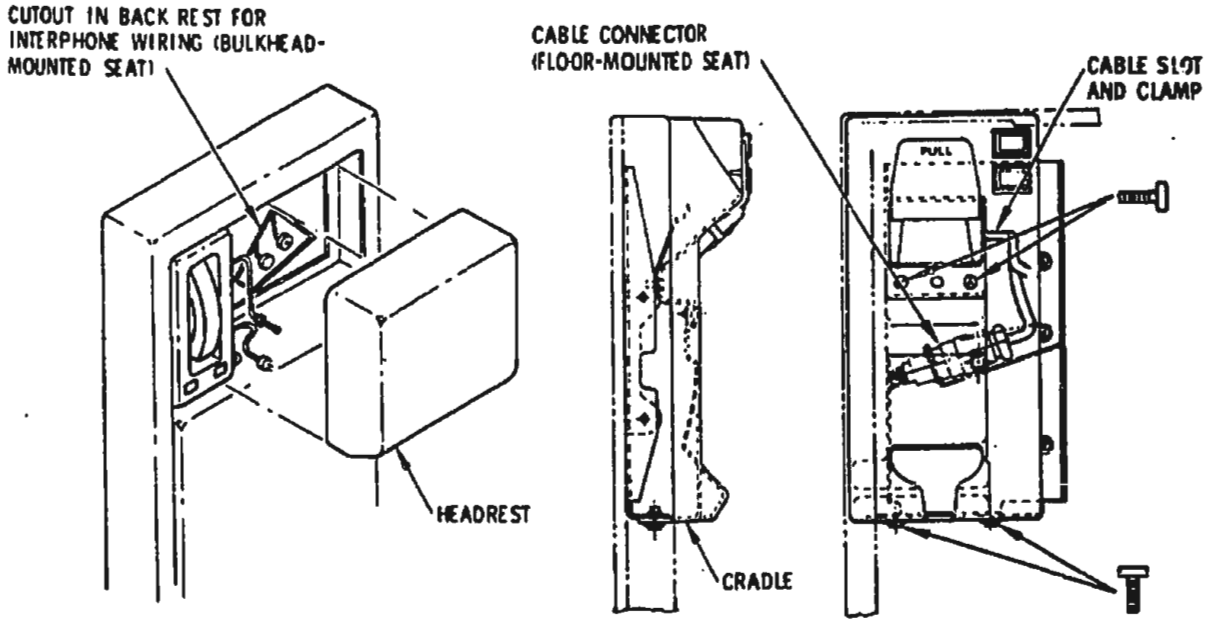
(4) Slide headrest and backrest cushions into position and press firmly to engage Velcro fasteners.

(5) Perform handset and cradle test (Ref. Step 3).



NOTE

1. ATTENDANT SEAT LOCATION WITH DUAL HANDSET
2. ATTENDANT SEAT LOCATION WITH SINGLE HANDSET



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Attendant Seat Handset and Cradle - Removal and Installation
Figure 401

C. Mid Cabin Service Center - Handset and Cradle Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7).

(2) PULL handset release handle and remove handset from cradle.

Remove two screws from bottom of handset cradle with offset screwdriver (Ref. Fig. 402).

CAUTION: SUPPORT HANDSET CRADLE TO PREVENT DAMAGE TO CALL LIGHT WIRES.

(3) Remove two screws under handset. Turn cradle to expose call light wires. Remove and tag wires.

On aircraft 001-031:
Disconnect handset connector from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp.

On aircraft 032-999:
disconnect handset adapter connector on cradle from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp, and disconnect handset connector from cradle.

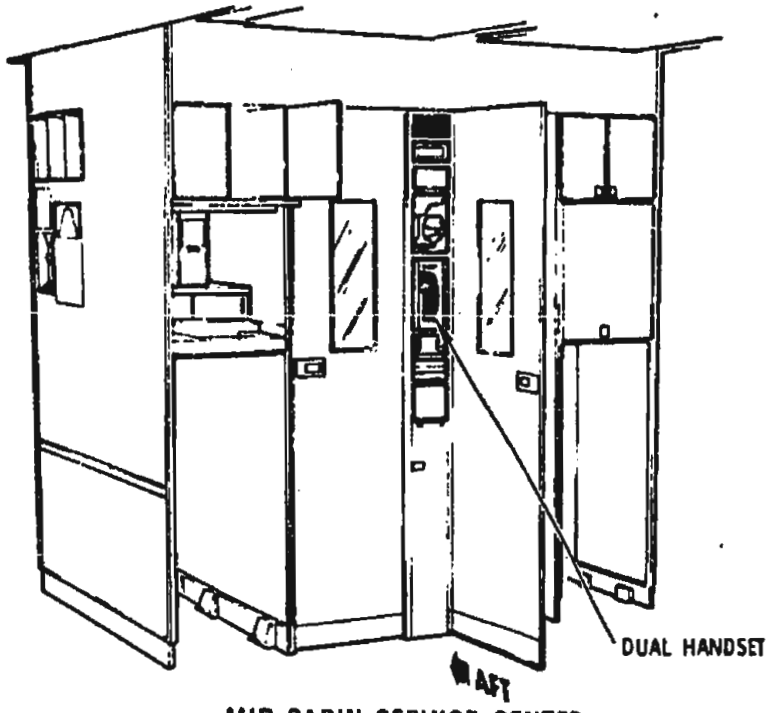
D. Mid Cabin Service Center - Handset and Cradle Installation

(1) Verify that circuit breakers opened in Step 2C(1) are opened and tagged.

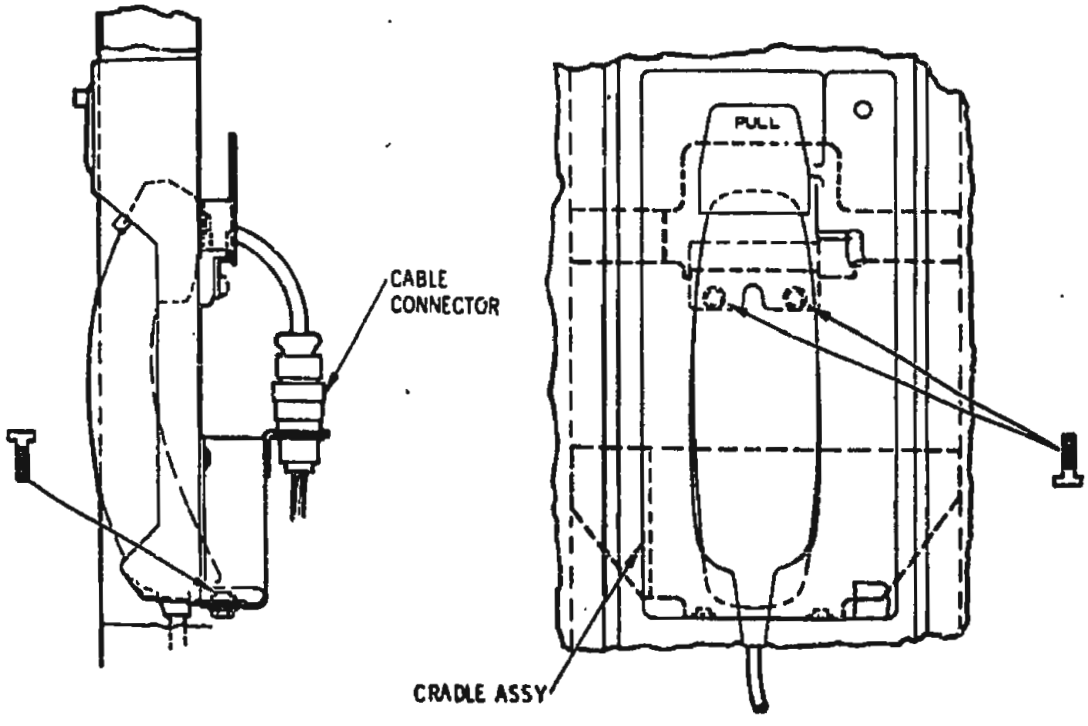
(2) On aircraft 001-031:
R slide handset cord into slot in cradle, leaving about four inches of cord between cradle and connector (enough to reach aircraft connector - Ref. Fig. 402). Install cord clamp and tighten screws. Connect handset connector.

(2) On aircraft 032-999:
R slide handset cord into slot in cradle, with the first loop of the cord against the outside of the cradle (Ref. Fig. 402). Connect handset connector to cradle, then install cord clamp and tighten screws. Connect cradle connector to aircraft connector.

CAUTION: SUPPORT CRADLE TO PREVENT DAMAGE TO CALL LIGHT WIRES.



MID CABIN SERVICE CENTER



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R Mid Cabin Service Center Handset and Cradle
R Removal and Installation
R Figure 402

(3) Connect call light wires.

Hold cradle in position and install two screws under handset.

Using offset screwdriver, install two screws in bottom of handset cradle.

Install handset in cradle.

Close circuit breakers opened in Step 2C(1).

(4) Perform handset and cradle test (Ref. Step 3).

E. Lower Galley - Handset and Cradle Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7).

(2) PULL handset release handle and remove handset.

Remove two screws from bottom of handset cradle with offset screwdriver (Ref. Fig. 403).

CAUTION: SUPPORT HANDSET CRADLE TO PREVENT DAMAGE TO CALL LIGHT WIRES.

(3) Remove two screws under handset.

R (4) Turn cradle to expose call light wires. Remove and tag wires.

On aircraft 001-031:
disconnect handset connector from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp.

On aircraft 032-999:
disconnect handset adapter connector on cradle from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord clamp, and disconnect handset connector from cradle.

F. Lower Galley - Handset and Cradle Installation

(1) Verify that circuit breakers opened in Step 2E(1) are open and tagged.

(2) On aircraft 001-031:
slide handset cord into slot in cradle, leaving about four inches of cord between cradle and connector
R (enough to reach aircraft connector - Ref. Fig. 403). Install cord clamp and tighten screws. Connect handset connector.

(2) On aircraft 032-999:
slide handset cord into slot in cradle, with the first
R loop of the cord against the outside of the cradle
R (Ref. Figure 403). Connect handset connector to cradle, then install cord clamp and tighten screws. Connect cradle connector to aircraft connector.

(3) Connect handset connector.

R CAUTION: SUPPORT CRADLE TO PREVENT DAMAGE TO CALL LIGHT WIRES.

(4) Connect call light wires.

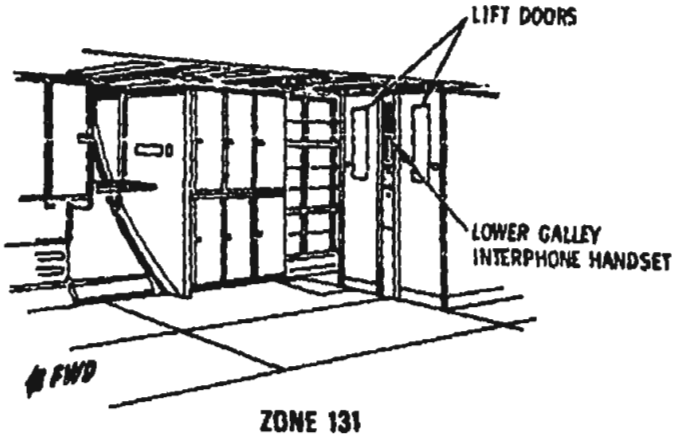
Hold cradle in position and install two screws under handset.

Using offset screwdriver, install two screws in bottom of handset cradle.

Install handset in cradle.

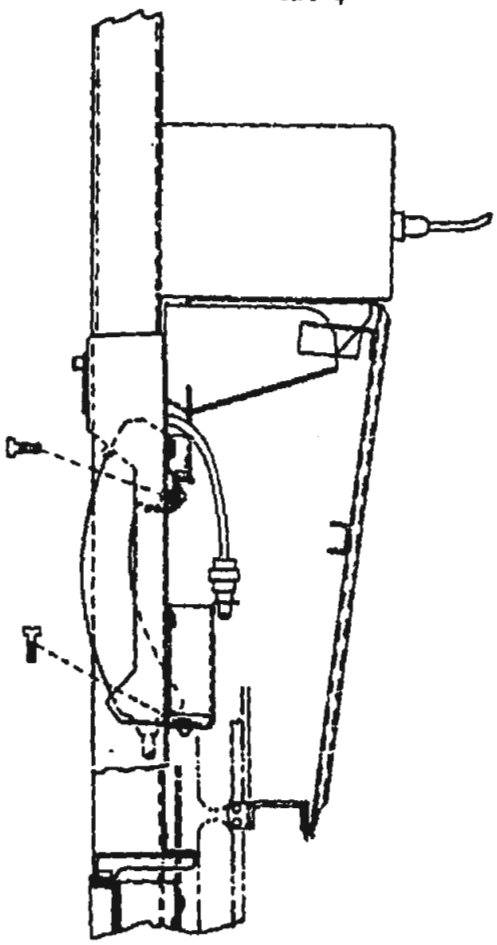
Close circuit breakers opened in Step 2E(1).

(5) Perform handset and cradle test (Ref. Step 3).



ZONE 131
GALLEY

AFT



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Lower Galley Handset and Cradle - Removal and Installation
Figure 403

3. Test Handset and Cradle

A. Single Handset and Cradle

NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

On aircraft 032-999:
verify that switches on handset cradles are in ON position before starting test. If any cradle switches are OFF during test, corresponding handset can not be tested. With switch OFF, audio and dial lines are disconnected from handset (dial line is connected to zener diode in handset adapter in cradle to maintain continuity). Handset can not receive calls, but at handset pair positions (1 CLASS, FWD CAB, MID CAB, and AFT CAB), pink cabin call lights will operate unless both handsets are turned OFF. At handset pair positions with both handsets turned OFF, pink cabin call lights on EXIT signs will come on and stay on. At mid cabin service center and lower galley handset positions, single pink cabin call light on handset cradle will come on and stay on with cradle switch OFF.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breakers PASSENGER SERVICE - HOST ADVSY IND (C8), and GROUND SERVICE - CABIN & GALLEY INTPH (L7) are closed.

(3) Verify that passenger address (PA) system is turned on (Ref. 23-31-00).

(4) At handset which is to be tested, PULL handset release handle and remove handset from cradle.

(5) On handset dial thumbwheel, select each station call address, and at each address depress CALL. Verify the following (Ref. Table 401):

Call light(s) corresponding to called station come on.

One HI/LO chime sounds in area corresponding to called station.

Call lights go off when thumbwheel is moved to next station call address (call lights remain on at last station called).

(6) Speak into handset.

Verify that audio is loud and clear in handset receiver.

(7) Return handset to cradle.

Verify that call light(s) go out at last station called in Step 3A(5).

(8) For handset cradles with WORK and ENTRY switchlights (handset cradles at all attendant seat positions), verify the following:

Corresponding attendant WORK lights operate properly (Ref. 33-22-00).

Corresponding ENTRY area lights operate properly (Ref. 33-24-00).

(9) Turn off electrical power (Ref. 24-00-00).

B. Dual Handset and Cradle

NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

On aircraft 032-999:
verify that switches on handset cradles are in ON position before starting test. If any cradle switches are OFF during test, corresponding handset can not be tested. With switch OFF, audio and dial lines are disconnected from handset (dial line is connected to zener diode in handset adapter in cradle to maintain continuity). Handset can not receive calls. At dual handset positions, green galley call lights will not operate with cradle switch OFF.

(1) With handset GALLEY/CABIN switch in CABIN position, perform Steps 3A(1) through 3A(7) to test dual handset operation on cabin interphone line (Ref. Table 401).

(2) Move GALLEY/CABIN switch to GALLEY position.

On handset dial thumbwheel, select each galley interphone station call address, and at each address depress CALL. Verify the following (Ref. Table 402):

Call lights(s) corresponding to called station come on.

One HI/LO chime sounds in area corresponding to called station.

Call lights go off when thumbwheel is moved to next station call address (call lights remain on at last station called).

(3) Speak into handset.

Verify that audio is loud and clear in handset receiver.

(4) Return handset to cradle.

Verify that call light(s) go out at last station called in Step 3B(2).

(5) For handset cradles with WORK and ENTRY switchlights (handset cradles at all attendant seat positions), verify the following:

Corresponding attendant WORK lights operate properly (Ref. 33-22-00).

Corresponding ENTRY area lights operate properly (Ref. 33-24-00).

(6) Turn off electrical power (Ref. 24-00-00).

R Cabin Interphone Calls - Single and Dual Handsets
R Table 401

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
FLT STA	Flight station	Flight station	Blue CALL light on flight station control unit
1 CLASS	Attendant seats by L1 and R1 doors	First class (PA ampl 1)	Pink call lights on EXIT signs by L1 and R1 doors
NOTE:	With INTERPHONE CHIME - CLASS DIVIDER switch (FS 1178, above ceiling by submux 2) in FWD OF GALLEY LIFT position, call to 1 CLASS address sounds first class HI/LO chime (PA ampl 1); and call to FWD CAB, MID CAB, AFT CAB, or UP GALY address sounds coach HI/LO chime (PA ampl 2).		
	With switch in AFT OF GALLEY LIFT position, call to 1 CLASS, FWD CAB, MID CAB, AFT CAB, or UP GALY sounds HI/LO chime in first class and coach (PA ampl 1 and 2).		
FWD CAB	Attendant seats by L2 and R2 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L2 and R2 doors
MID CAB	Attendant seats by L3 and R3 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L3 and R3 doors
AFT CAB	Attendant seats by L4 and R4 doors	Coach area (PA ampl 2)	Pink call lights on EXIT signs by L4 and R4 doors
UP GALY	Mid Cabin Service Center between lifts	Coach area (PA ampl 2)	Pink call light on handset cradle, and green call lights on EXIT signs by L2 and R2 doors
DN GALY	Lower galley between lifts (handset)	Lower galley	Pink call light on handset cradle

R Galley Interphone Calls - Dual Handsets
R Table 402

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
NOTE:	Green call lights are installed on EXIT signs above all passenger compartment doors, but only the green lights by the dual handset positions (L1, L2, R2, and R4 doors) operate. The green lights on the EXIT signs above the R1, R3, L3, and L4 doors are not connected.		
1 CLASS	Attendant seat by L1 door	First class (PA ampl 1)	Green call light on EXIT sign by L1 door
NOTE:	With INTERPHONE CHIME - CLASS DIVIDER switch (FS 1178, above ceiling by submux 2) in FWD OF GALLEY LIFT position, call to 1 CLASS address sounds first class HI/LO chime (PA ampl 1); and call to AFT CAB or UP GALY address sounds coach HI/LO chime (PA ampl 2).		
	With switch in AFT OF GALLEY LIFT position, call to 1 CLASS, AFT CAB, or UP GALY sounds HI/LO chime in first class and coach (PA ampl 1 and 2).		
AFT CAB	Attendant seat by R4 door	Coach area (PA ampl 2)	Green call light on EXIT sign by R4 door
UP GALY	Mid Cabin Service Center between lifts	Coach area (PA ampl 2)	Green call lights on EXIT signs by L2 and R2 doors
DN GALY	Lower galley between lifts (galley intph unit)	Lower galley	Blue CALL RESET light on interphone unit

HANDSET AND CRADLE - REMOVAL AND INSTALLATION

1. Referenced Procedures

20-33-03	Square Switchlight - Removal and Installation
23-31-00	Passenger Address System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
33-22-00	Cabin Attendant Work Lighting - Adjustment and Test
33-24-00	Entrance Area Lighting - Adjustment and Test

2. Removal/Installation

A. Attendant Seat - Handset and Cradle Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit
R breaker GROUND SERVICE - CABIN/SVCE INTPH (L7).

(2) At attendant seat, remove headrest and backrest cushions as follows (Ref. Fig. 401):

Remove headrest cushion by pulling out on bottom to separate Velcro fastener, then slide down to clear retaining bracket and pull cushion out.

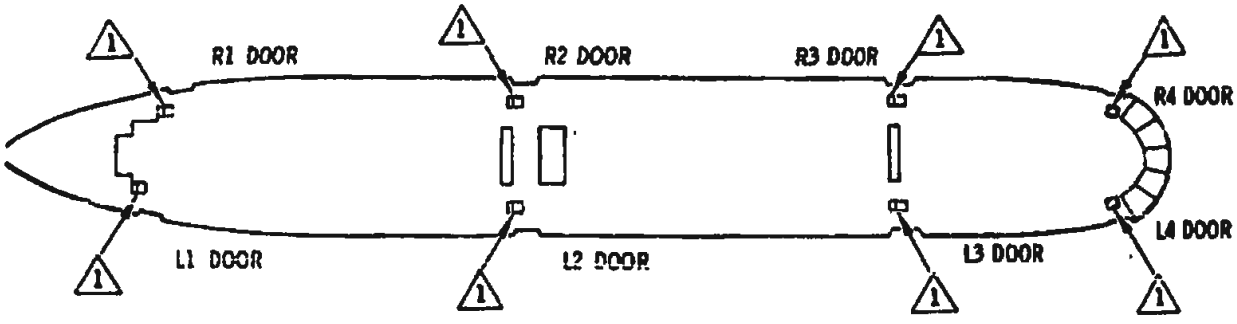
Remove backrest cushion by pulling down seat bottom, and pulling out on backrest cushion to separate Velcro fastener.

(3) PULL handset release handle and remove handset from cradle.

CAUTION: SUPPORT CRADLE TO PREVENT SWITCHLIGHT WIRE DAMAGE.

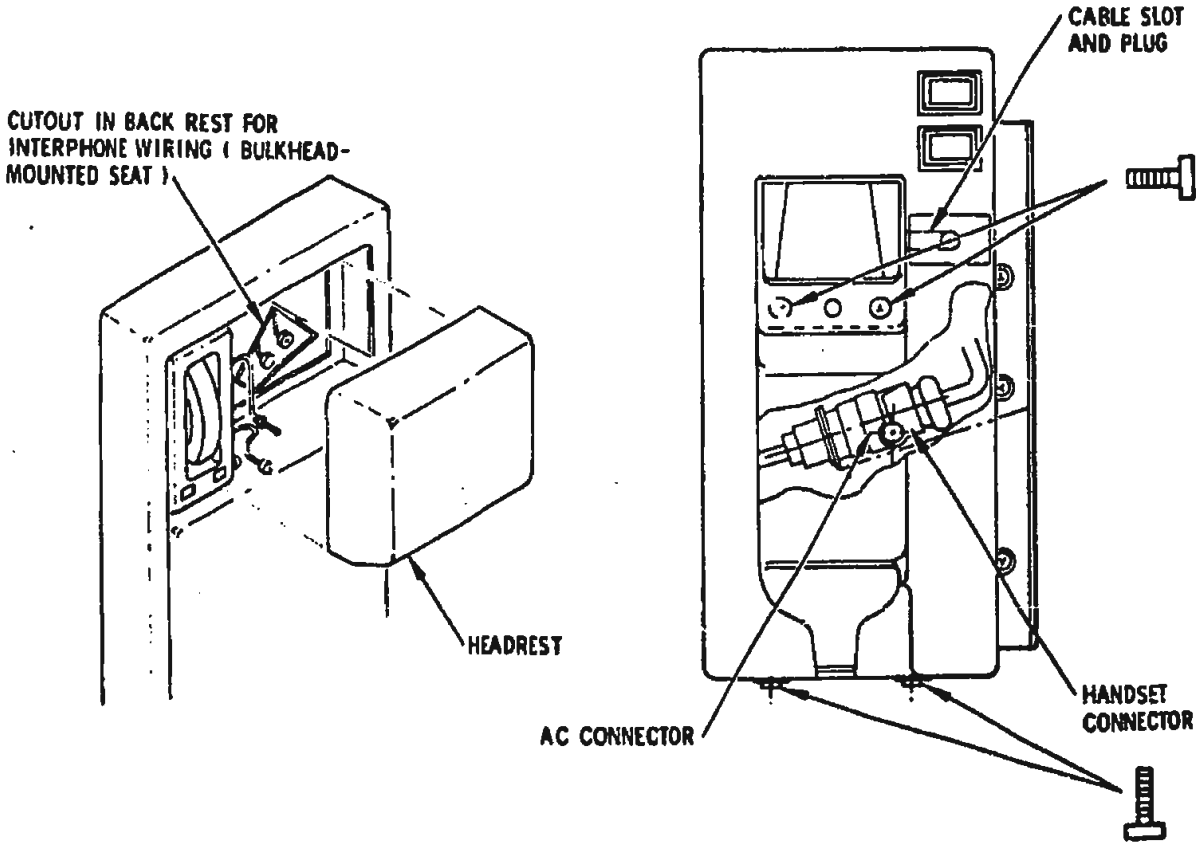
(4) Remove two screws under handset and two screws on bottom of cradle. Turn cradle to expose switchlight wires and handset connector. Remove wires from switchlights and tag (Ref. 20-33-03).

Disconnect handset adapter connector on cradle from aircraft connector, and remove handset and cradle. To separate handset from cradle, remove screws from handset cord plug, and remove handset connector and cord from cradle.



NOTE

1 ATTENDANT HANDSET LOCATION


CUTOUT IN BACK REST FOR INTERPHONE WIRING (BULKHEAD-MOUNTED SEAT)
HEADREST
CABLE SLOT AND PLUG
AC CONNECTOR
HANDSET CONNECTOR

M1-35000-23-146

R R Attendant Seat Handset and Cradle - Removal and Installation
Figure 401

R R R EFFECTIVITY: 032-999

B. Attendant Seat - Handset and Cradle Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Slide handset cord into slot in cradle, and replace
R cord plug with first loop of cord against outside of
R cradle (Ref. Fig. 401). Connect handset connector and screw to aircraft connector.

CAUTION: SUPPORT CRADLE TO PREVENT SWITCHLIGHT WIRE DAMAGE.

(3) Insert wires into switchlights (Ref. 20-33-03). Hold cradle in position and install two screws under handset and two screws on bottom.

Insert handset into cradle.

(4) Slide headrest and backrest cushions into position and press firmly to engage Velcro fasteners.

(5) Perform handset and cradle test (Ref. Step 3).

3. Test Handset and Cradle

A. Single Handset and Cradle

R NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breaker GROUND SERVICE - CABIN/SVCE INTPH (L7) is closed.

R (3) Verify that passenger call system is turned on (Ref.
R 33-26-00).

(4) At handset which is to be tested remove handset from cradle.

(5) On handset dial thumbwheel, select each station call address, and at each address depress CALL. Verify the following (Ref. Table 401):

Call light(s) corresponding to called station come on.

One HI/LO chime sounds in area corresponding to called station.

Call lights go off when thumbwheel is moved to next
R station call and automatically reset in 50 seconds if not otherwise reset.

(6) Speak into handset.

Verify that audio is loud and clear in handset receiver.

(7) Return handset to cradle.

Verify that call light(s) go out at last station called in Step 3A(5).

(8) For handset cradles with WORK and ENTRY switchlights (handset cradles at all attendant seat positions), verify the following:

Corresponding attendant WORK lights operate properly (Ref. 33-22-00).

Corresponding ENTRY area lights operate properly (Ref. 33-24-00).

(9) Turn off electrical power (Ref. 24-00-00).

Cabin Interphone Calls
Table 401

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
FLT STA	Flight station	Flight station	Blue CALL light on flight station control unit
L/R1	Attendant seats by L1 and R1 doors	First class (electronic chime)	Pink call lights on EXIT signs by L1 and R1 doors
L/R2	Attendant seats by L2 and R2 doors	Coach area (electronic chime)	Pink call lights on EXIT signs by L2 and R2 doors

Cabin Interphone Calls (Cont)
Table 401

CALL ADDRESS	HANDSET LOCATION	CHIMES (AREA)	CALL LIGHT(S) - LOCATION
L/R3	Attendant seats by L3 and R3 doors	Coach area (electronic chime)	Pink call lights on EXIT signs by L3 and R3 doors
L/R4	Attendant seats by L4 and R4 doors	Coach area (electronic chime)	Pink call lights on EXIT signs by L4 and R4 doors
Lower galley	Lower galley between lifts	Lower galley (electonic chime)	Pink call light in lower galley

FLIGHT STATION CONTROL UNIT - REMOVAL AND INSTALLATION

1. Referenced Procedure

   23-41-00 Cabin and Galley Interphone System - Adjustment and Test

2. Removal/Installation

   A. Removal

      (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers GROUND SERVICE - CABIN & GALLEY INTPH (L7), and PASSENGER SERVICE - HOST ADVSY IND (C8).

      (2) Support panel with one hand while releasing half-turn mounting fasteners (Ref. Fig. 401).

      (3) Lower panel and disconnect electrical connector on back of panel. Remove panel.

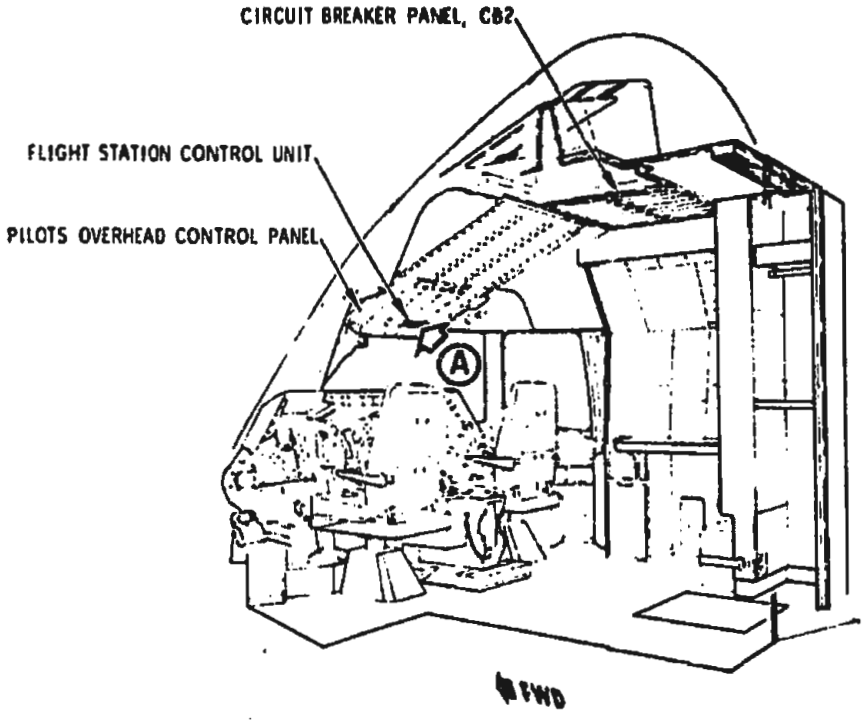
   B. Installation

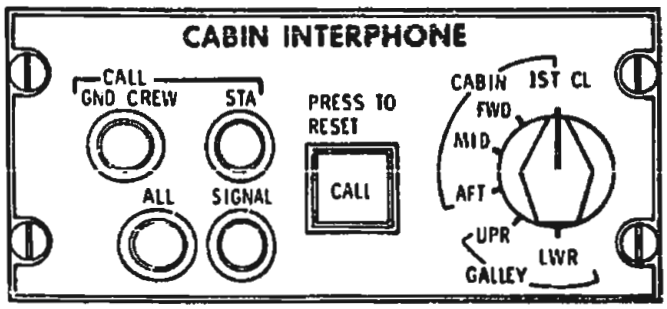
      (1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

      (2) Connect electrical connector to back of panel, and press panel into mount while securing fasteners (Ref. Fig. 401).

      (3) Remove tags and close circuit breakers opened in Step 2A(1).

      (4) Perform cabin and galley interphone operational test (Ref. 23-41-00).





A
FLIGHT STATION CONTROL UNIT

HH 9610
M1-0100-23-276

Flight Station Control Unit - Removal and Installation
Figure 401

FLIGHT STATION CONTROL UNIT REMOVAL AND INSTALLATION

R 1. Referenced Procedure

R 23-41-00 Cabin Interphone System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit
R breaker GROUND SERVICE - CABIN/SVCE INTPH (L7) and
R PASSENGER SERVICE - GND SVCE CALL SYSTEM (D9).

R (2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATION BUS - PA-NO. 1 (A15) and PA-NO. 2 (A16).

(3) Support panel with one hand while releasing half-turn mounting fasteners (Ref. Fig. 401).

(4) Lower panel and disconnect electrical connector on back of panel. Remove panel.

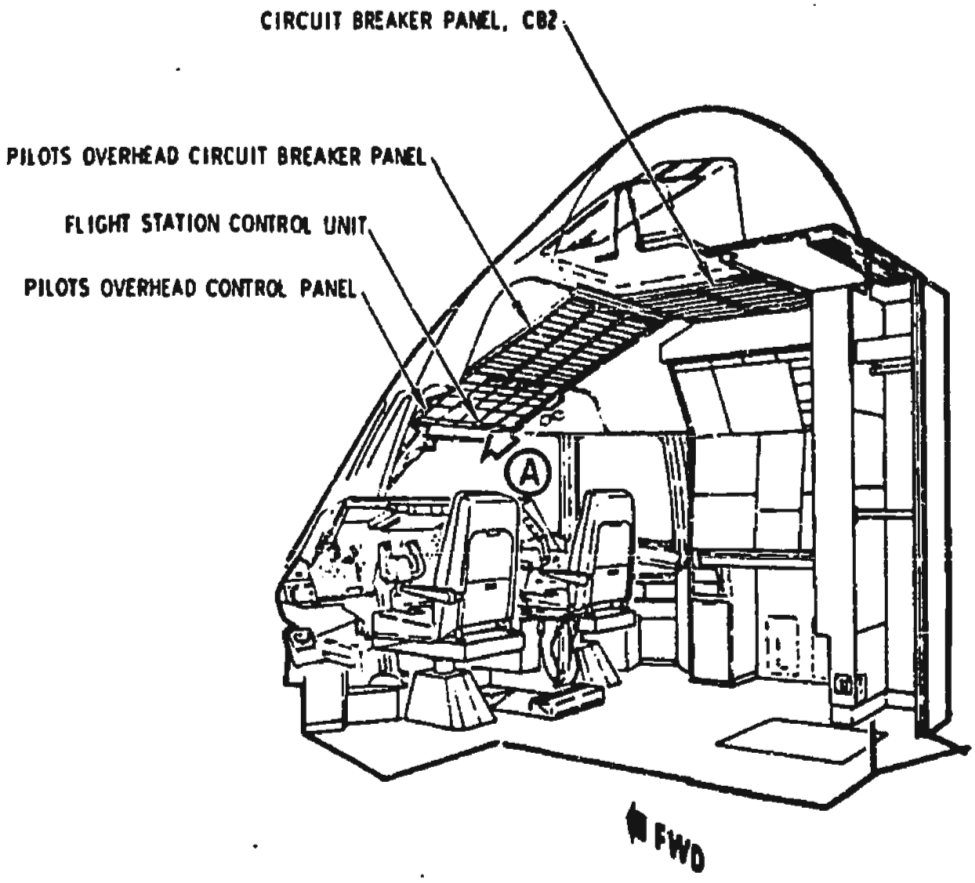
B. Installation

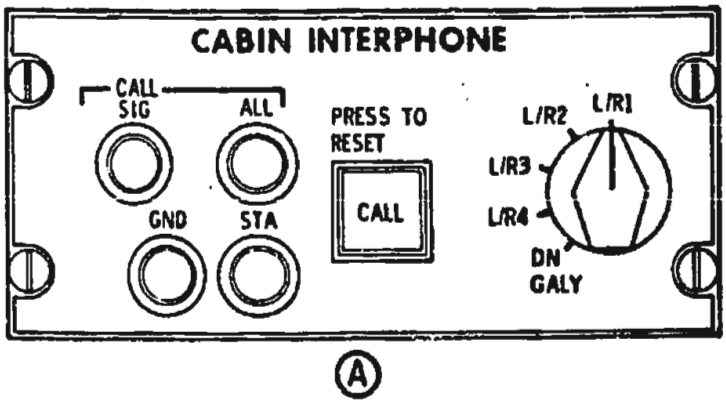
(1) Verify that circuit breakers opened in Step 2A(1) and (2) are open and tagged.

(2) Connect electrical connector to back of panel, and press panel into mount while securing fasteners (Ref. Fig. 401).

(3) Remove tags and close circuit breakers opened in Step 2A(1) and (2).

(4) Perform cabin interphone operational test (Ref. 23-41-00).





A

FLIGHT STATION CONTROL UNIT

M1-35000-23-170

R Flight Station Control Unit - Removal and Installation
R Figure 401

R EFFECTIVITY: 032-999

ELECTRONIC CHIME SPEAKER - REMOVAL AND INSTALLATION

1. Reference Procedures

23-31-00	Passenger Address System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - CABIN & GALLEY INTPH (L7).

(2) Remove screws supporting speaker grille and mounting panel (Ref. Fig. 401).

(3) Disconnect electrical connector from electronic chime speaker.

(4) Remove mounting screws and lift electronic chime speaker from speaker mounting panel.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Mount electronic chime speaker to speaker mounting panel with mounting screws (Ref. Fig. 401).

(3) Connect electrical connector to electronic chime speaker.

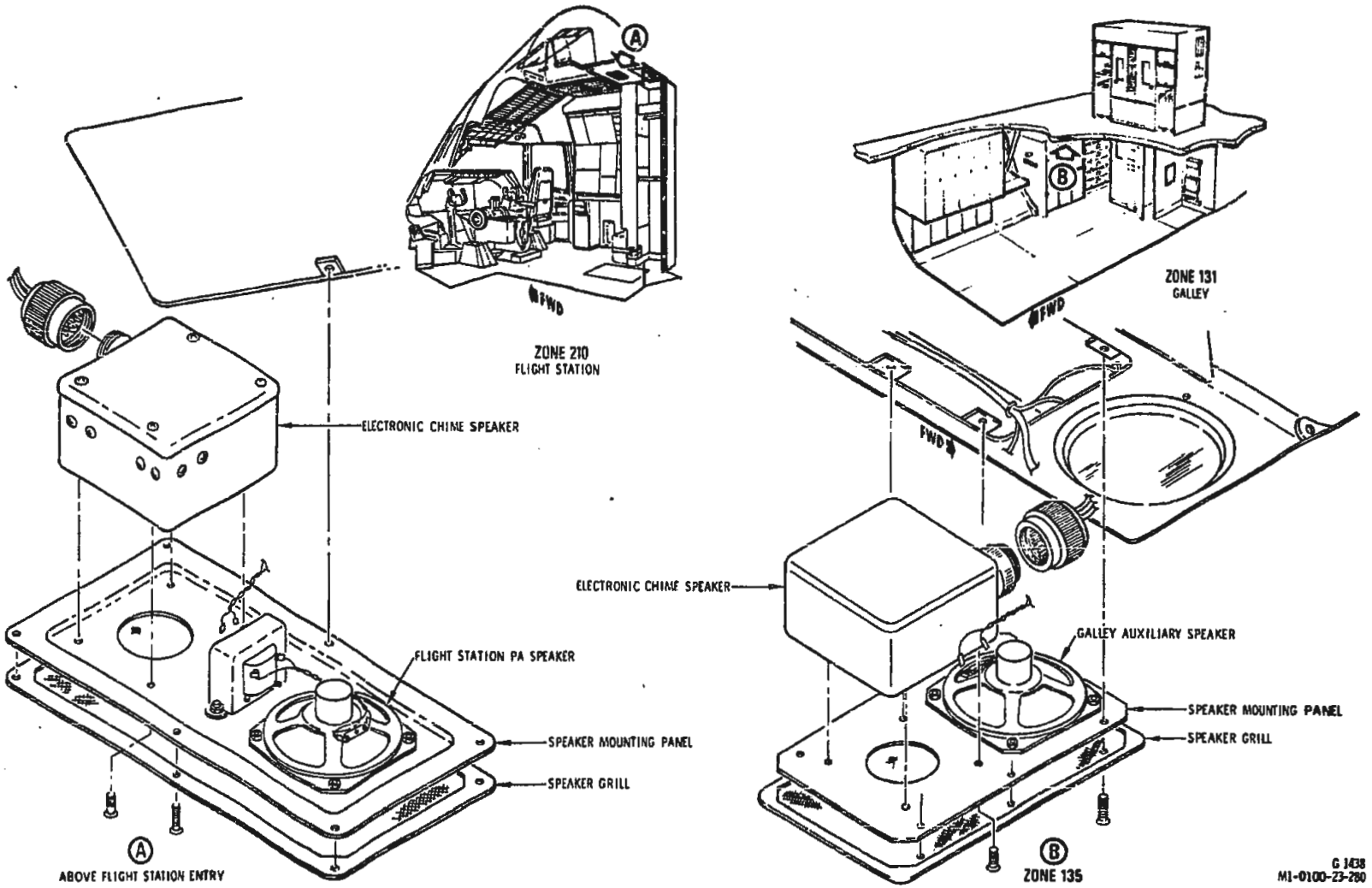
(4) Place speaker mounting panel and speaker grille into support frame and install mounting screws.

(5) Remove tag and close circuit breaker opened in Step 2A(1).

(6) Turn on electrical power (Ref. 24-00-00).

(7) Perform applicable portion of passenger address system operational test (Ref. 23-31-00.

(8) Turn off electrical power (Ref. 24-00-00).



Electronic Chime Speaker - Removal and Installation
Figure 401

EFFECTIVITY: 001-031

ELECTRONIC CHIME - REMOVAL AND INSTALLATION

1. Reference Procedures

   23-31-00 Passenger Address System - Adjustment and Test

   24-00-00 Electrical Power - Maintenance Practices

2. Removal/Installation

   A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers GROUND SERVICE - CABIN/SVCE INTPH (L7) and PASSENGER SERVICE - GND SVCE CALL SYSTEM (D9).

R (2) On Pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESS COMMUNICATIONS BUS - PA - No. 1 (A15) and PA - No. 2 (A16).

R (3) Remove screws supporting speaker grille and mounting panel (Ref. Fig. 401).

R (4) Disconnect electrical connector from electronic chime.

R (5) Remove mounting screws and lift electronic chime from speaker mounting panel.

   B. Installation

R (1) Verify that circuit breakers opened in Steps 2A(1) and 2A(2) are open and tagged.

(2) Mount electronic chime to speaker mounting panel with mounting screws (Ref. Fig. 401).

(3) Connect electrical connector to electronic chime.

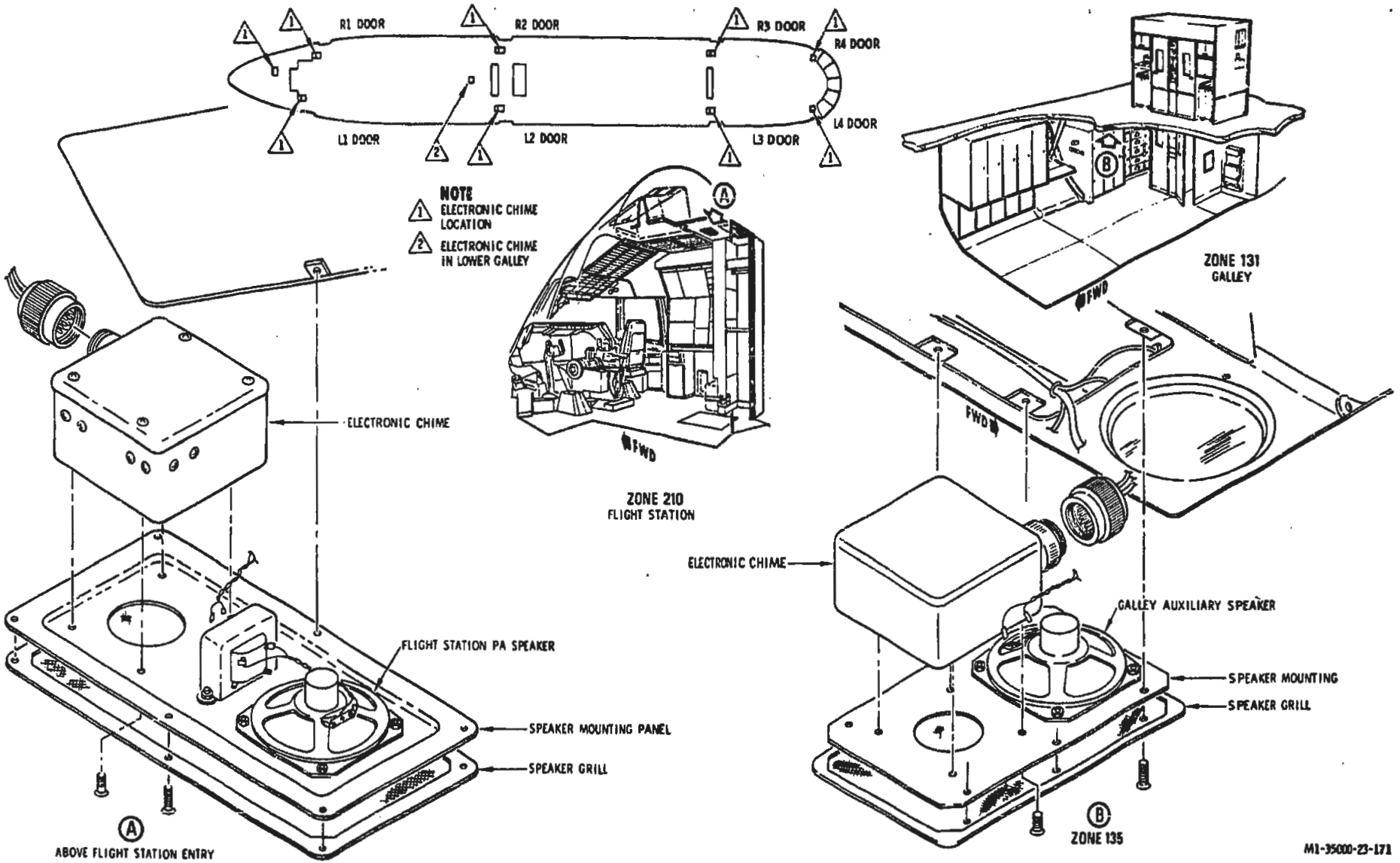
(4) Place speaker mounting panel and speaker grille into support frame and install mounting screws.

R (5) Remove tags and close circuit breakers opened in Steps 2A(1) and 2A(2).

(6) Turn on electrical power (Ref. 24-00-00).

(7) Perform chime portion of passenger address system operational test (Ref. 23-31-00).

(8) Turn off electrical power (Ref. 24-00-00).



R R Electronic Chime - Removal and Installation
Figure 401

R R R R EFFECTIVITY: 032-999

0028

GALLEY INTERPHONE UNIT - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-31-00	Passenger Address System - Adjustment and Test
23-41-00	Cabin and Galley Interphone System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
25-32-00	Galley Lift System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - CABIN & GALLEY INTPH (L7).

(2) Turn on electrical power (Ref. 24-00-00).

(3) At upper galley lift control panel, zone 250, raise left lift cage to full up position (Ref. 25-32-00). Rotate lift master key switch clockwise to right lift ONLY position and remove key.

NOTE: If left lift cage can not be raised, raise right lift cage, turn master key switch clockwise to left lift ONLY or OFF position, and remove key.

(4) On galley left circuit breaker panel, zone 131, open and tag circuit breaker PASS SERV BUS 1L - LIFT LEFT.

On galley right circuit breaker panel, open and tag circuit breaker LIFT - RIGHT.

R WARNING: LOWER MECHANICAL STOPS TO BLOCK LIFT CAGE UP BEFORE ENTERING LIFT ENCLOSURE.

(5) Release lift door latch with screwdriver and open lift door. Lower lift mechanical stops to block lift cage in up position.

R WARNING: IF BOTH LIFT CAGES ARE RAISED, MECHANICAL STOPS MUST BE POSITIONED TO BLOCK BOTH CAGES UP.

DO NOT OPERATE EITHER LIFT WITH PERSONNEL IN ANY PART OF LIFT ENCLOSURE.

(6) Disconnect electrical connector on rear of galley interphone unit (Ref. Fig. 401).

(7) Remove four screws securing interphone unit to support bracket. Slide interphone unit aft to remove.

(8) If additional clearance is required to remove interphone unit, loosen emergency evacuation panel and drip shield above unit. Slide panel up to clear interphone unit front flange. After interphone unit is removed, tighten nuts to secure emergency evacuation panel.

NOTE: On aircraft 007-999, drip shield is installed above emergency evacuation panel.

On aircraft 001-006, drip shield is not installed above emergency evacuation panel.

(9) Raise lift mechanical stops to unblock lift cage. Close lift door.

(10) Close circuit breakers opened in Step 2A(4).

(11) At upper galley lift control panel, insert key and rotate master key switch to BOTH.

(12) Turn off electrical power.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Turn on electrical power (Ref. 24-00-00).

(3) At upper galley lift control panel, zone 250, raise left lift cage to full up position (Ref. 25-32-00). Rotate lift master key switch clockwise to right lift ONLY position and remove key.

NOTE: If left lift cage can not be raised, raise right lift cage, turn master key switch clockwise to left lift ONLY or OFF position, and remove key.

(4) On galley left circuit breaker panel, zone 131, open and tag circuit breaker PASS SERV BUS 1L - LIFT LEFT.

On galley right circuit breaker panel, open and tag circuit breaker LIFT - RIGHT.

R WARNING: LOWER MECHANICAL STOPS TO BLOCK LIFT CAGE UP BEFORE ENTERING LIFT ENCLOSURE.

(5) Release lift door latch with screwdriver and open lift door. Lower lift mechanical stops to block lift cage in up position.

R WARNING: IF BOTH LIFT CAGES ARE RAISED, MECHANICAL STOPS MUST BE POSITIONED TO BLOCK BOTH CAGES UP.

DO NOT OPERATE EITHER LIFT WITH PERSONNEL IN ANY PART OF LIFT ENCLOSURE.

(6) Slide galley interphone unit forward into position. If additional clearance is required to install interphone unit, loosen emergency evacuation panel and drip shield above unit. Slide panel up to clear interphone unit front flange. After interphone unit is installed, tighten nuts to secure emergency evacuation panel.

NOTE: On aircraft 007-999, drip shield is installed above emergency evacuation panel.

On aircraft 001-006, drip shield is not installed above emergency evacuation panel.

(7) Align interphone unit with four holes in support bracket, insert screws, and tighten to secure unit.

(8) Connect electrical connector on rear on interphone unit.

On interphone unit, select UPR GALLEY MONITOR to ON, and turn VOLUME control full up (clockwise).

(9) Raise lift mechanical stops to unblock lift cage. Close lift door.

(10) Close circuit breakers opened in Step 2B(4).

(11) At upper galley lift control panel, insert master key in switch and rotate to BOTH.

NOTE: Verify that all cabin and galley interphone handsets are properly installed and secured in cradles before starting test.

(12) On FE/SO overhead circuit breaker panel CB2, close circuit breakers GROUND SERVICE - CABIN & GALLEY INTPH (L7), and PASSENGER SERVICE - HOST ADVSY IND (C8).

(13) Verify that passenger address system is turned on (Ref. 23-31-00).

(14) At upper galley, remove interphone handset from cradle, select CABIN, rotate thumbwheel to DN GAL, and depress CALL.

Verify that one HI/LO chime sounds in lower galley (open lift door to listen).

R (15) On handset, select GALLEY and depress CALL. Speak into handset.

Verify that one HI/LO chime sounds in lower galley, and that handset voice can be heard from galley interphone unit and remote speakers.

Return handset to cradle.

(16) On galley interphone unit, select UPR GALLEY MONITOR to ON.

Speak into upper galley remote microphone.

Verify that microphone voice can be heard from galley interphone unit and remote speakers.

(17) On lower galley interphone unit, rotate selector to FIRST CLASS, then UPPER GALLEY, and then AFT CABIN. At each position depress CALL. Verify the following:

HI/LO chime tone sounds once in first class or coach area (as applicable) for each station called.

Green lights on EXIT signs by forward left, upper galley, and aft right attendants positions come on when station is called.

Green lights go off when selector switch is moved to next position (lights stay on at last position called).

NOTE: Green call lights are installed on EXIT signs above all passenger compartment doors, but only the green lights by the dual handset positions

(L1, L2 and R2, and R4 doors) operate. The green lights on the EXIT signs above the R1, L3 and R3, and L4 doors are not connected.

(18) On interphone unit, depress CALL RESET.

Verify that green call light goes out at last station called.

R (19) Remove upper galley handset from cradle, select GALLEY, and listen in handset receiver.

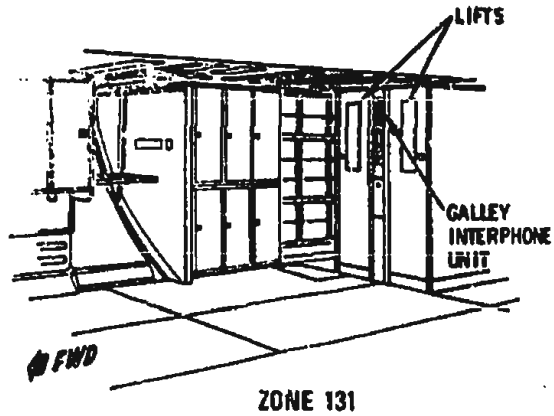
On lower galley interphone unit, depress TALK switch and speak into MICROPHONE.

Verify that voice is loud and clear in upper galley handset.

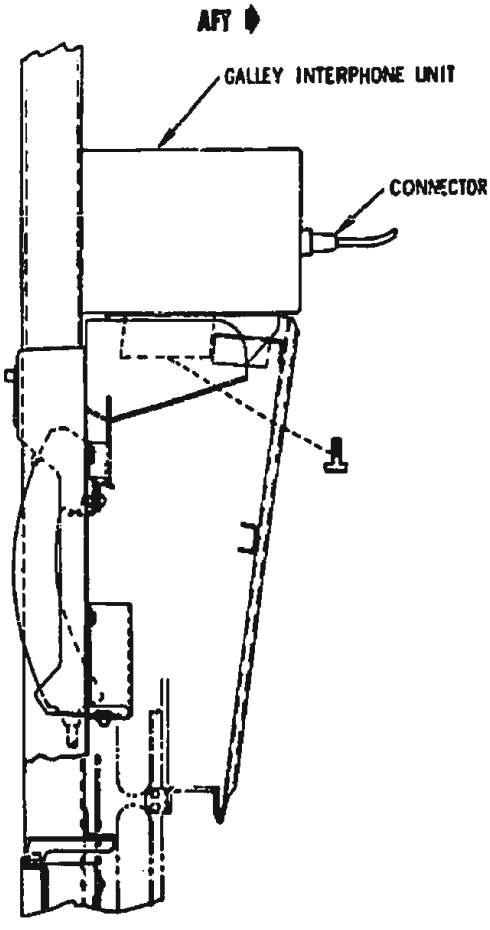
Turn interphone unit VOLUME control to mid-range, and select UPR GALLEY MONITOR to OFF.

Return upper galley handset to cradle.

R (20) Turn off electrical power (Ref. 24-00-00).



ZONE 131
GALLEY



MI-1602-23-284

R Galley Interphone Unit - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

AUXILIARY SPEAKER - REMOVAL AND INSTALLATION

R 1. Reference Procedures

	23-41-00	Cabin and Galley Interphone System - Adjustment and Test
R	24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag circuit
R breaker GROUND SERVICE - CABIN & GALLEY INTPH (L7).

R (2) Remove screws supporting speaker grille and and mounting panel (Ref. Fig. 401).

(3) Disconnect electrical connector from electronic chime speaker and spade lug wire terminals from auxiliary speaker.

(4) Remove mounting screws and lift auxiliary speaker from mounting panel.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Mount auxiliary speaker to speaker mounting panel with mounting screws (Ref. Fig. 401).

(3) Connect correct wire spade lug terminals to auxiliary speaker terminals and electrical connector to electronic chime speaker.

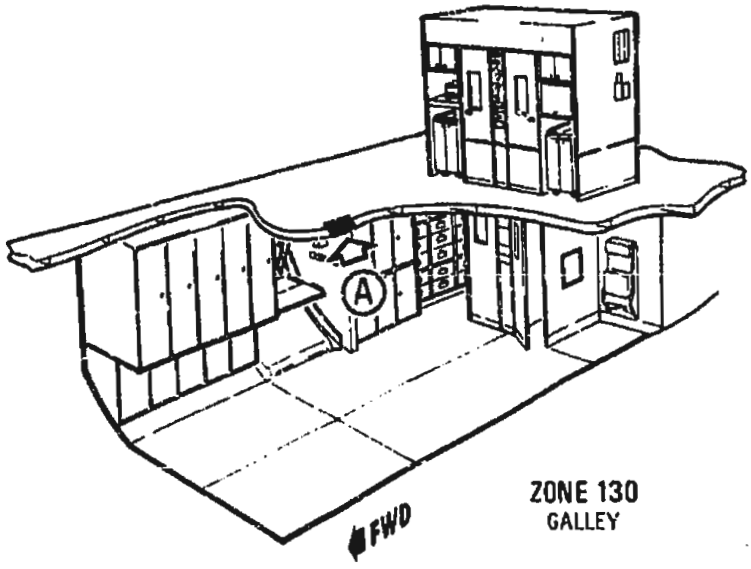
R (4) Place speaker mounting panel and speaker grille into support frame and install mounting screws.

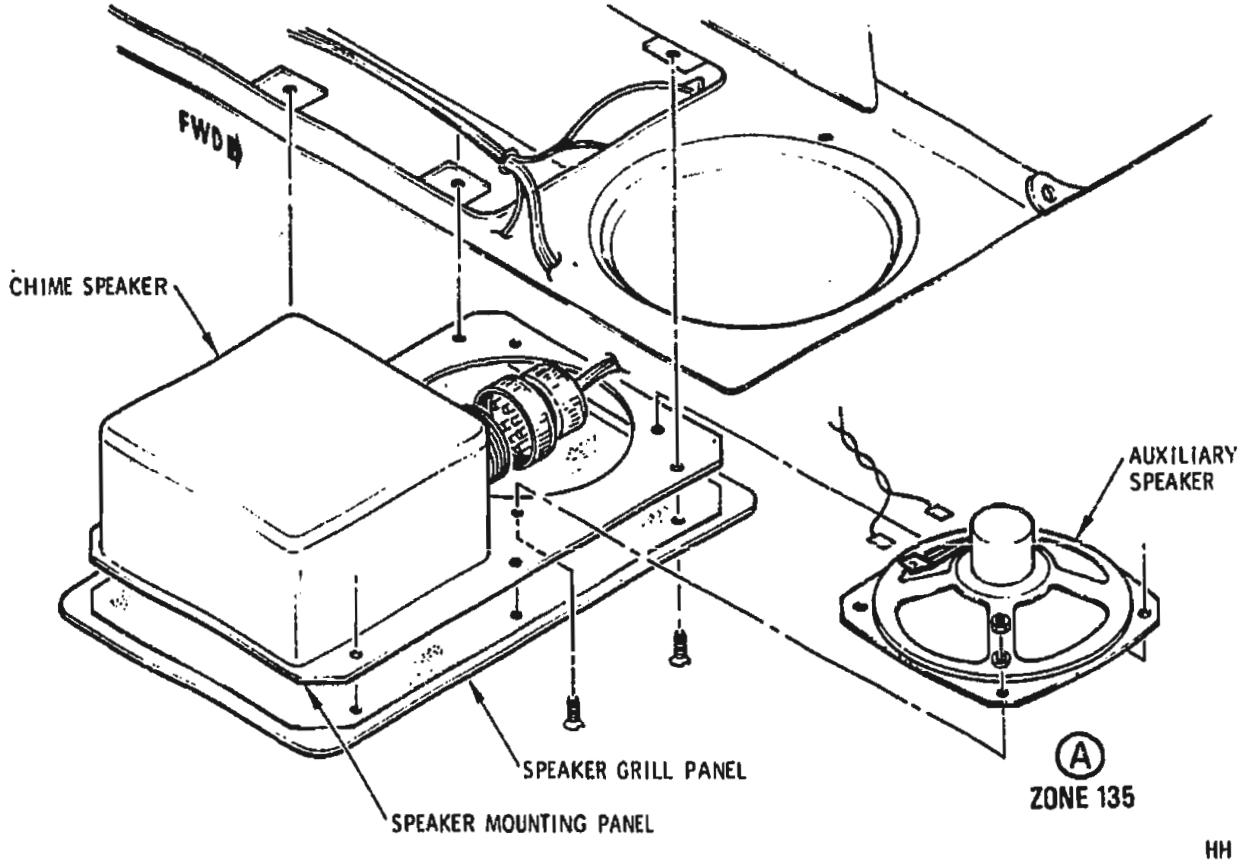
(5) Remove tag and close circuit breaker opened in Step 2A(1).

(6) Turn on electrical power (Ref. 24-41-00).

(7) Perform applicable portion of cabin and galley interphone system operational test (Ref. 23-41-00).

(8) Turn off electrical power (Ref. 24-41-00).





HH 8947
M1-0101-23-231

R Auxiliary Speaker - Removal and Installation
R Figure 401

CABIN/SERVICE INTERPHONE ACCESSORY UNIT - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit
R breaker GROUND SERVICE - CABIN/SVCE INTPH (L7).

(2) Locate cabin/service interphone accessory unit in forward electronic service center, zone 113, rear rack, shelf No. 1.

(3) Loosen knurled thumbscrew and disengage from mounting bracket at front of amplifier; remove amplifier (Ref. Fig. 401).

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Position ACC. UNIT in rack and secure with knurled thumbscrew (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step 2A(1).

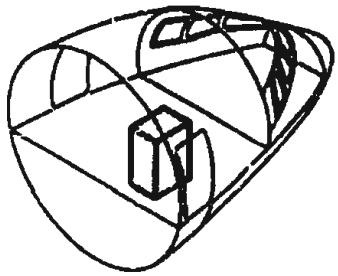
(4) Turn on electrical power (Ref. 24-00-00).

(5) Verify that audio integrating system is on (Ref. 23-51-00).

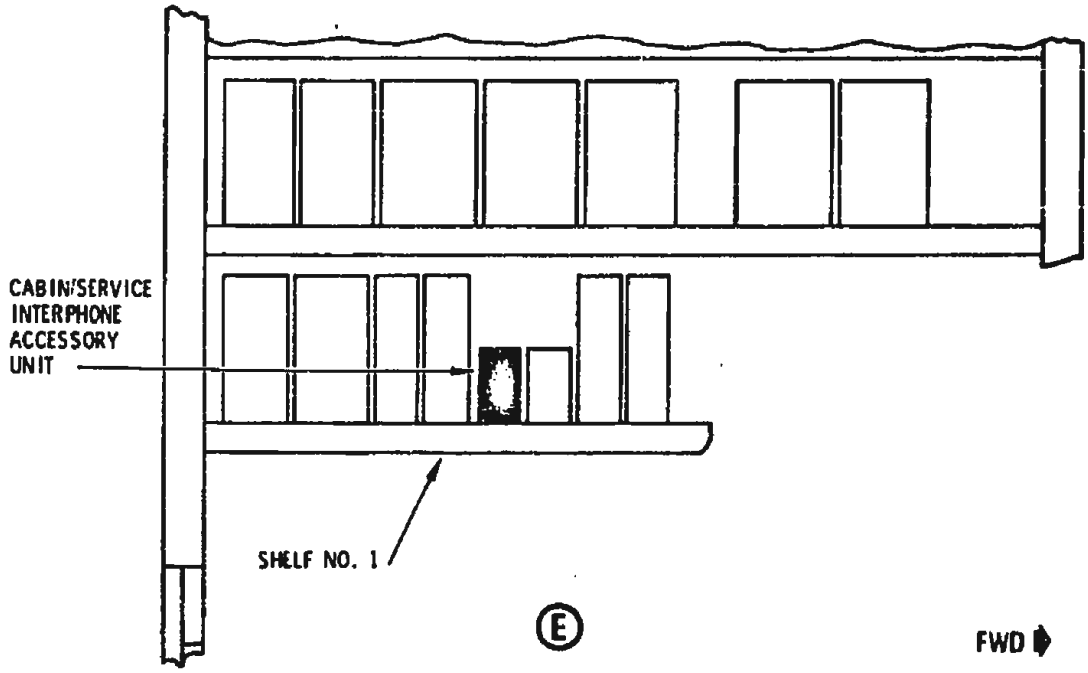
(6) At Flight Engineer/Second Officers position under forward edge of table, depress SERVICE INTERPHONE - ON switchlight.

Connect service interphone handset to service interphone jack.

Key interphone handset and speak into microphone.



ZONE 113



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING FORWARD

M1-92000-23-3165

R Cabin/Service Interphone Accessory Unit - Removal and Installation
R Figure 401

R EFFECTIVITY: 032-999

R
R
001B

Verify that sidetone audio is loud and clear.

R R R R (7) On any flight station audio selector panel, depress MIC SEL - INT and INT CABIN/SERV switches. Turn INT CABIN/SERV audio control clockwise to increase audio level.

Key and speak into audio integrating system microphone.

Verify that audio is loud and clear in service interphone handset.

Release audio integrating system microphone key.

Speak into service interphone handset microphone.

Verify that audio is loud and clear in audio integrating system headset.

(8) Release SERVICE INTERPHONE - ON switchlight and disconnect service interphone handset.

Turn off electrical power (Ref. 24-00-00).

SERVICE INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

1. General

The service interphone system provides a communication link for ground service operations. The communication link is made through phone jacks located at major servicing areas throughout the aircraft (Ref. Fig. 1). Additional service communication coverage is provided by the service interphone interface with the audio integrating system (Ref. 23-51-00), and the cabin and galley interphone system (Ref. 23-41-00). Major components in the system are:

An interphone amplifier located in the forward electronics service center, zone 113

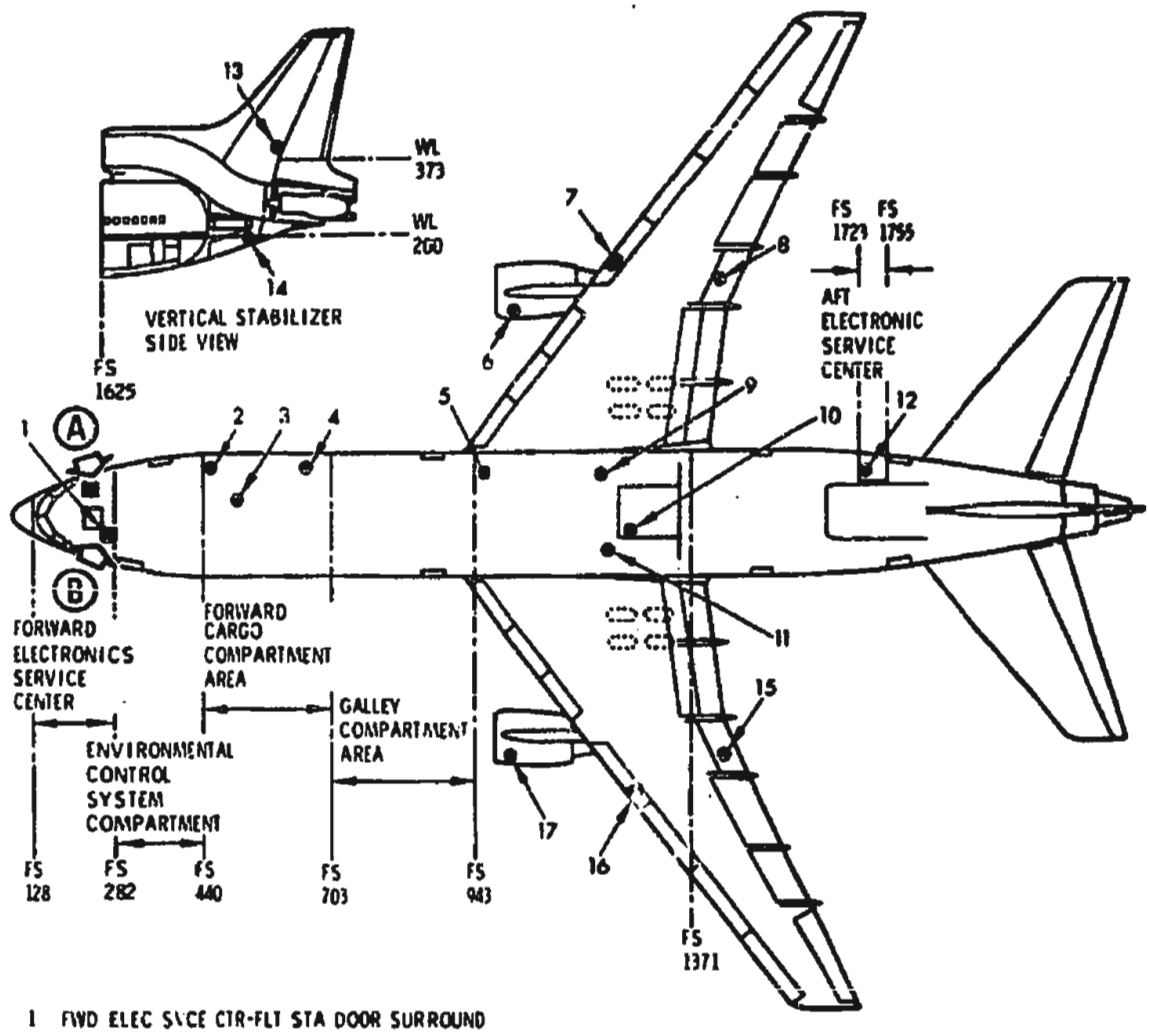
Eighteen parallel-connected headset jacks located throughout the aircraft

A switchlight (SERVICE INTERPHONE ON) control located on the Flight Engineer/Second Officers (FE/SO) MIC SELECTION panel, zone 215.

All service interphone jacks are connected to the interphone amplifier through an audio distribution unit control relay circuit (Ref. 23-51-00). The relay circuit is energized whenever the SERVICE INTERPHONE ON switchlight is depressed. The audio integrating system headsets interface with the service interphone whenever the MIC SEL - INT and the INT CABIN/SERV pushbutton switches on the audio selector panel are depressed. The cabin interphone line of the cabin and galley interphone system interfaces with the service interphone amplifier whenever power is applied to both systems. With the service interphone, audio integrating, and cabin and galley interphone systems interfaced, a communication party line with 33 interphone positions is possible. These positions are the 18 service interphone jacks, ten cabin attendant seat position handsets, and the five flight crew audio selector panel positions. Power for the interphone system is supplied by the 28V dc ground service bus through the GND SVCE INTPH circuit breaker located on the FE/SO overhead circuit breaker panel CB2, zone 215.

2. Operation

With power supplied to the ground service bus (Ref. Fig. 2), the GND SVCE INTPH circuit breaker connects 28V dc power to the interphone amplifier and to the SERVICE INTERPHONE ON switchlight. When the SERVICE INTERPHONE ON switchlight is depressed, 28V dc is connected to the audio distribution unit to



1 FWD ELEC SVCE CTR-FLT STA DOOR SURROUND

2 RIGHT ENVIRONMENTAL CONT SYS COMPT INSIDE OF AFT DOOR SURROUND-DOOR 118CR

3 EXT PWR RECEPTACLE-DOOR 124AB

4 FWD CARGO COMPT DOOR FRAME ABOVE CARGO LOADING CONTROLLER-DOOR 821

5 MID ELEC SVCE CTR GALLEY DOOR OUTBD SIDE BY LT SWITCH-DOOR 1321R

6 NO. 3 ENG NACELLE LEFT SIDE-DOOR 421SL

7 RIGHT WING FUEL GND JACK PNL-DOOR 621GB-1

8 RIGHT INBD AILERON-DOOR 651BB

9 RIGHT MLG DOOR GND RELEASE PANEL-FWD OF WHEEL WELL

10 HYDR SVCE CTR FWD END ON HYDR SVCE PANEL UPPER LEFT CORNER-DOOR 147AB

11 LEFT MLG DOOR GND RELEASE PANEL-FWD OF WHEEL WELL

12 AFT ELEC SVCE AREA ON SVCE PANEL-DOOR 162BR

13 VERT STAB ON AFT EDGE OF STAB BOX SECTION BY TOP OF RUDDER SERVO-DOORS 324AL/AR

14 AFTERBODY NO. 2 ENG COMPT SVCE LIGHT HANDLE-DOOR 318BB

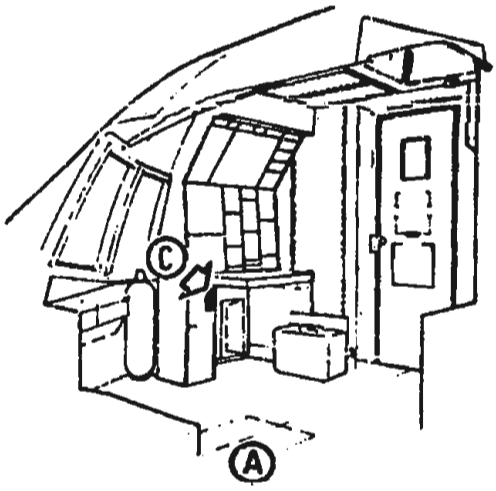
15 LEFT INBD AILERON-DOOR 551BB

16 LEFT WING FUEL GND JACK PNL-DOOR 521GB-1

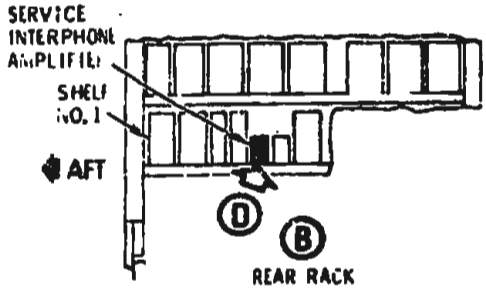
17 NO. 1 ENG NACELLE LEFT SIDE-DOOR 411SL

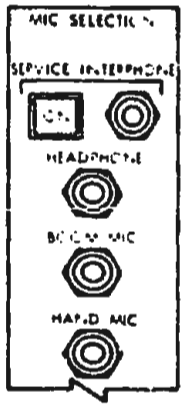
MI-1609-23-153

Service Interphone System Equipment and Location
Figure 1 (Sheet 1)

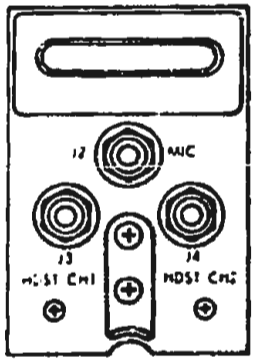


FLIGHT ENGINEERS SECOND OFFICERS POSITION





C



D

FLIGHT ENGINEER/SECOND OFFICERS PANEL

911-4401-21-183

Service Interphone System Equipment and Location
Figure 1 (Sheet 2)

energize the service interphone relay circuit, and the switchlight illuminates. In the energized position, the service interphone relay circuit connects the service interphone jacks to the service interphone amplifier summing circuit. The relay circuit also connects channel 1 audio to the cabin interphone audio circuit (Ref. 23-41-00). Interphone audio from the audio selector panels (if selected), and cabin interphone audio from the flight station interphone unit, are also applied to the summing circuit. Audio signals from the summing network are amplified by amplifier channels 1 and 2. Channel 1 output is routed through the audio distribution unit matching circuit to the five audio selector panels. Channel 2 output is routed to the service interphone jack circuit. When the SERVICE INTERPHONE ON switchlight is released, the service interphone relays in the distribution unit are deenergized and the ON light goes off. In the deenergized position, the interphone jack circuit is disconnected from the interphone amplifier, and the jacks are grounded in the audio distribution unit.

3. Service Interphone Amplifier

A. Description

The service interphone amplifier is a solid-state, rack-mounted unit. The major subassemblies of the amplifier are a summing network, two amplifier circuits and a power supply circuit (Ref. Fig. 3). The service interphone amplifier provides two power level outputs for the audio received from the service interphone system jacks, the audio selector panels, and the cabin and galley interphone system. The two power level outputs (100 milliwatts and 3 watts) function as follows:

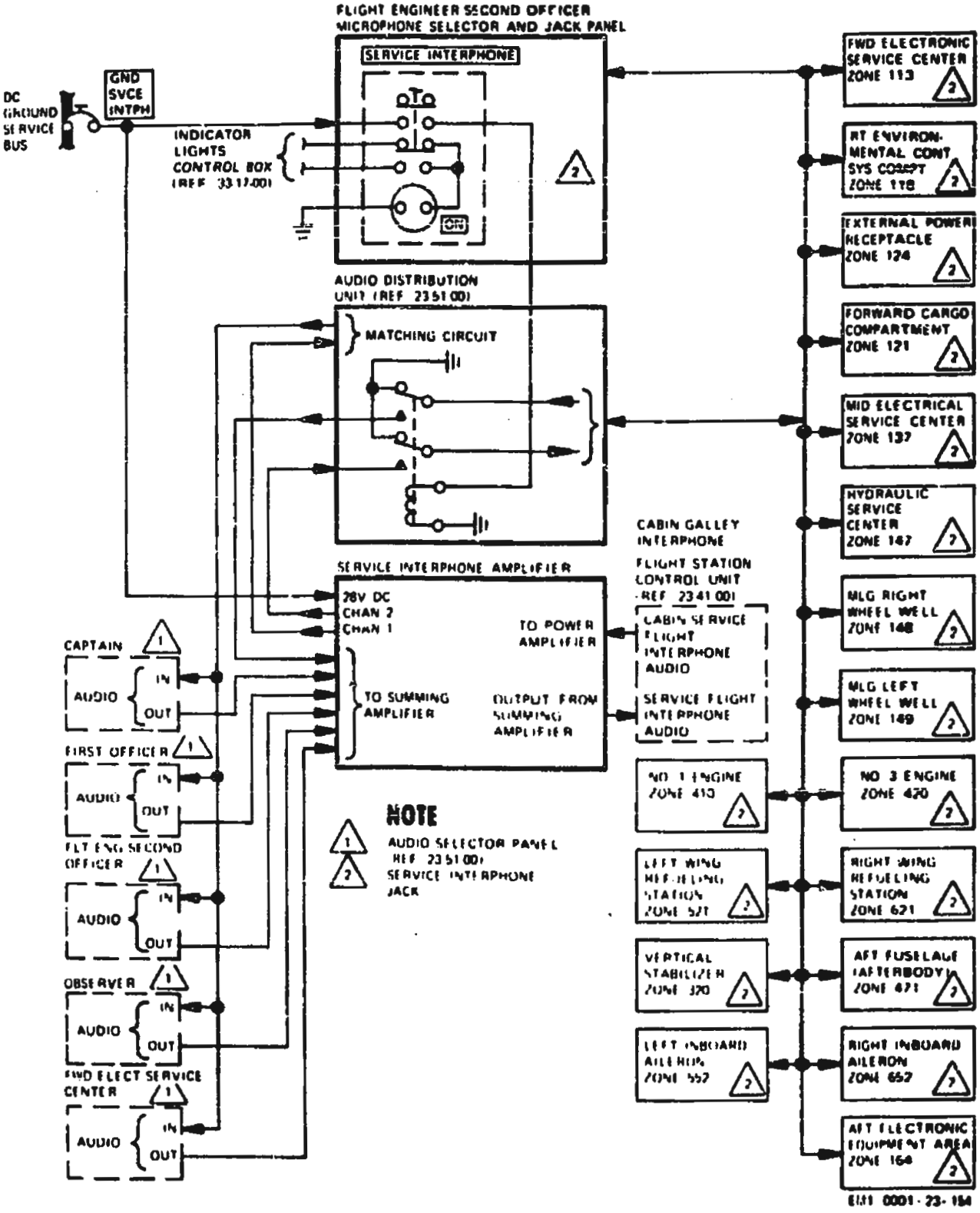
(1) 100-milliwatt Amplifier Output (channel 1)

Channel 1 provides an output of 100 milliwatts (maximum) to drive five flight interphone headsets (Ref. 23-51-00).

(2) 3-watt Amplifier Output (channel 2)

Channel 2 provides an output of 3 watts (maximum) to drive the service interphone system headset jacks.

The power level of the outputs is adjusted by two gain controls accessible through holes in the top of the unit. Located on the front panel are three jacks designated J2 MIC, J3 HDST CH 1, and J4 HDST CH 2. Each jack provides a test point for the amplifier input and output circuits. Jack J2 MIC enables a microphone input to be applied to the


FLIGHT ENGINEER SECOND OFFICER MICROPHONE SELECTOR AND JACK PANEL
SERVICE INTERPHONE
ON
DC GROUND SERVICE BUS
GND SVCE INTPH
INDICATOR LIGHTS CONTROL BOX (REF 3317-001)
AUDIO DISTRIBUTION UNIT (REF 2351-001)
MATCHING CIRCUIT
SERVICE INTERPHONE AMPLIFIER
28V DC
CHAN 2
CHAN 1
TO POWER AMPLIFIER
TO SUMMING AMPLIFIER
OUTPUT FROM SUMMING AMPLIFIER
CAPTAIN
FIRST OFFICER
FLT ENG SECOND OFFICER
OBSERVER
FWD ELECT SERVICE CENTER
AUDIO
IN
OUT
CABIN GALLEY INTERPHONE
FLIGHT STATION CONTROL UNIT (REF 2341-001)
CABIN SERVICE FLIGHT INTERPHONE AUDIO
SERVICE FLIGHT INTERPHONE AUDIO
NOTE
AUDIO SELECTOR PANEL (REF 2351-001) SERVICE INTERPHONE JACK
NO 1 ENGINE ZONE 410
NO 3 ENGINE ZONE 420
LEFT WING REFUELING STATION ZONE 521
RIGHT WING REFUELING STATION ZONE 621
VERTICAL STABILIZER ZONE 320
AFT FUSELAGE (AFTERBODY) ZONE 671
LEFT INBOARD AILERON ZONE 552
RIGHT INBOARD AILERON ZONE 652
AFT ELECTRONIC EQUIPMENT AREA ZONE 164
FWD ELECTRONIC SERVICE CENTER ZONE 113
RT ENVIRONMENTAL CONT SYS COMPT ZONE 118
EXTERNAL POWER RECEPTACLE ZONE 124
FORWARD CARGO COMPARTMENT ZONE 121
MID ELECTRICAL SERVICE CENTER ZONE 137
HYDRAULIC SERVICE CENTER ZONE 147
MLG RIGHT WHEEL WELL ZONE 148
MLG LEFT WHEEL WELL ZONE 149
EIM 0001-23-154

Service Interphone System Block Diagram
Figure 2

amplifier circuits so that the outputs can be monitored at jack J3 (channel 1) and jack J4 (channel 2).

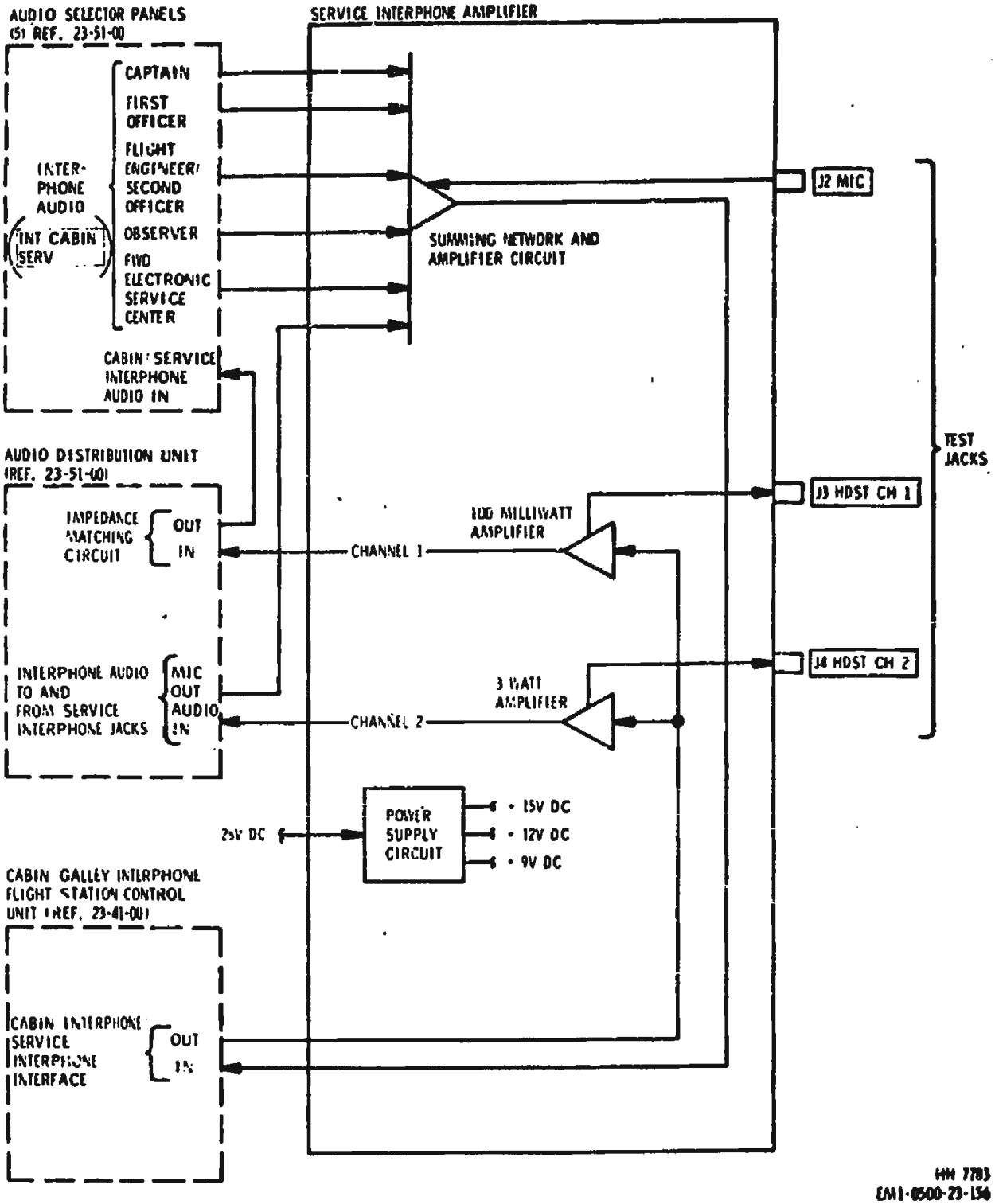
B. Operation

When the SERVICE INTERPHONE ON switchlight is depressed, the microphone voice inputs from the service interphone jacks are connected to the summing amplifier input (Ref. Fig. 3). Microphone voice inputs from the flight interphone are connected to the summing amplifier input when the MIC SEL - INT and INT CABIN/SERV switches on the audio selector panels are depressed (Ref. 23-51-00).

The output of the summing amplifier is connected to the cabin and galley interphone flight station control unit (cabin interphone line - Ref. 23-41-00). The flight station control unit combines the service interphone audio with the cabin and galley interphone audio.

The output of the flight station control unit is connected to both channel 1 and 2 power amplifiers. The audio signals are amplified to the rated power levels to drive the flight interphone headsets and the service interphone headsets. The amplifier output signals are also routed to the J3 and J4 headset jacks for test monitoring purposes.

Audio input signals from microphone jack J2 are applied to the summing network amplifier and are routed through the circuits in the same manner as the interphone audio signals.



Service Interphone Amplifier Block Diagram
Figure 3

SERVICE INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

1. General

The service interphone system provides a communication link for ground service operations. The communication link is made through phone jacks located at major servicing areas throughout the aircraft (Ref. Fig. 1). Additional service communication coverage is provided by the service interphone interface with the audio integrating system (Ref. 23-51-00), and the cabin interphone system (Ref. 23-41-00). Major components in the system are:

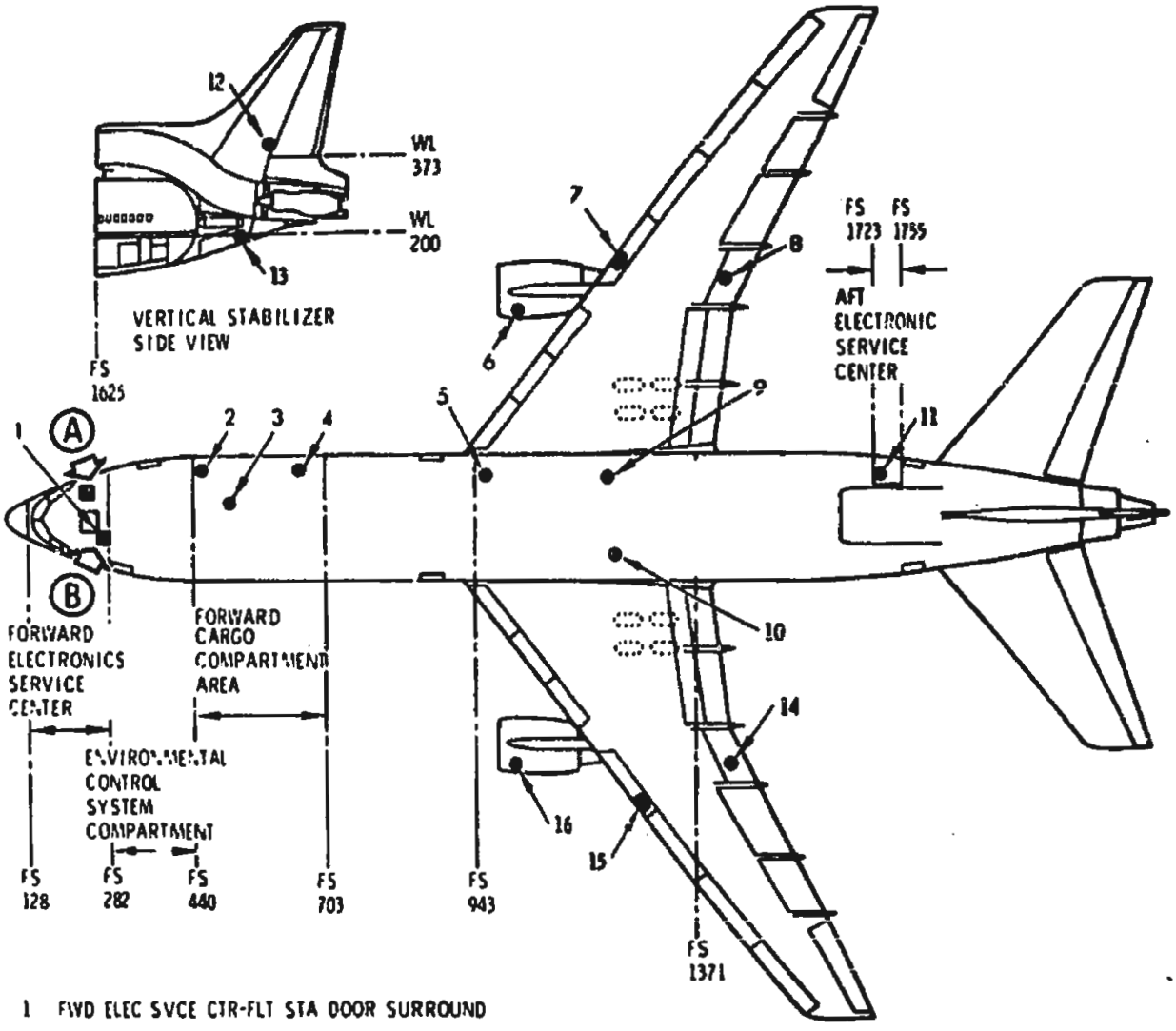
A cabin/service interphone accessory unit located in the forward electronics service center, zone 113

Sixteen parallel-connected headset jacks located throughout the aircraft

A switchlight (SERVICE INTERPHONE ON) control located on the Flight Engineer/Second Officers (FE/SO) MIC SELECTION panel, zone 215. The service interphone system is energized whenever the SERVICE INTERPHONE ON switchlight is depressed on the FE/SO jack panel. Relay K1, in the cabin/service interphone accessory unit, connects the service interphone
R jacks to the audio select panels and the cabin interphone
R handsets. The audio integrating system headsets interface with the service interphone whenever the MIC SEL-INT and INT CABIN/SERV pushbutton switches on the audio selector panel are depressed. The cabin interphone system interfaces with the cabin/service interphone accessory unit whenever the power is applied to both systems. With the service interphone, audio integrating, and cabin interphone systems interfaced, a communication party line with 31 interphone positions is possible. These positions are the 16 service interphone jacks, ten cabin attendant seat position
R handsets, and the four flight crew and one FESC audio selector panel positions. Power for the interphone system is supplied by the 28V dc ground service bus thru the CABIN/SVCE INTPH circuit breaker L7 located on the FE/SO overhead circuit breaker panel CB2, zone 215.

2. Operation

With power applied to the ground service bus (Ref. Fig. 2), the CABIN/SVCE INTPH circuit breaker connects 28V dc power to the cabin/service interphone accessory unit, and to the SERVICE INTERPHONE ON switchlight. When the SERVICE INTERPHONE ON switchlight is depressed, 28V dc energizes relay K1 in the



1 FWD ELEC SVCE CTR-FLT STA DOOR SURROUND

2 RIGHT ENVIRONMENTAL CONT SYS COMPT INSIDE OF AFT DOOR SURROUND-DOOR 118CR

3 GND PWR RECEPTACLE-DOOR 124AB

4 FWD CARGO COMPT DOOR FRAME ABOVE CARGO LOADING CONTROLLER-DOOR 821

5 MID ELEC SVCE CTR-RIGHT SIDE OF FORWARD BULKHEAD

6 NO. 3 ENG NACELLE LEFT SIDE-DOOR 421SL

7 RIGHT WING FUEL GND JACK PNL-DOOR 621GB-1

8 RIGHT INBD AILERON-DOOR 651BB

9 RIGHT MLG DOOR GND RELEASE PANEL-FWD OF WHEEL WELL

10 LEFT MLG DOOR GND RELEASE PANEL-FWD OF WHEEL WELL

11 AFT ELEC SVCE AREA ON SVCE PANEL-DOOR 162BR

12 VERT STAB ON AFT EDGE OF STAB BOX SECTION BY TOP OF RUDDER SERVO-DOORS 324AL/AR

13 AFTERBODY NO. 2 ENG COMPT SVCE LIGHT HANDLE-DOOR 318BB

14 LEFT INBD AILERON-DOOR 551BB

15 LEFT WING FUEL GND JACK PNL-DOOR 521GB-1

16 NO. 1 ENG NACELLE LEFT SIDE-DOOR 411SL

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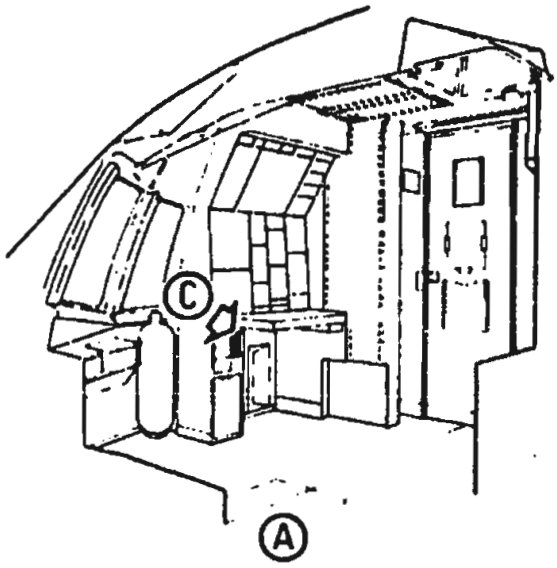
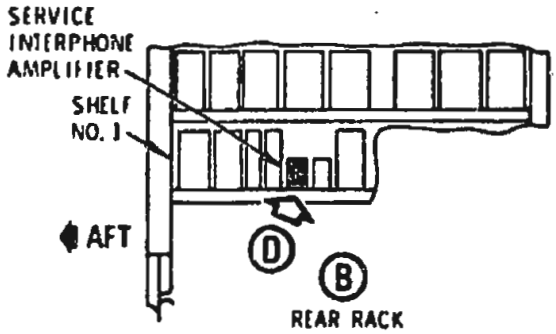
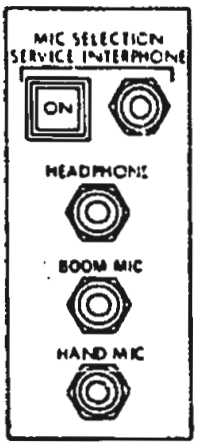
R Service Interphone System Equipment and Location
R Figure 1 (Sheet 1)

R EFFECTIVITY: 032-999



FLIGHT ENGINEERS/SECOND OFFICERS POSITION





C

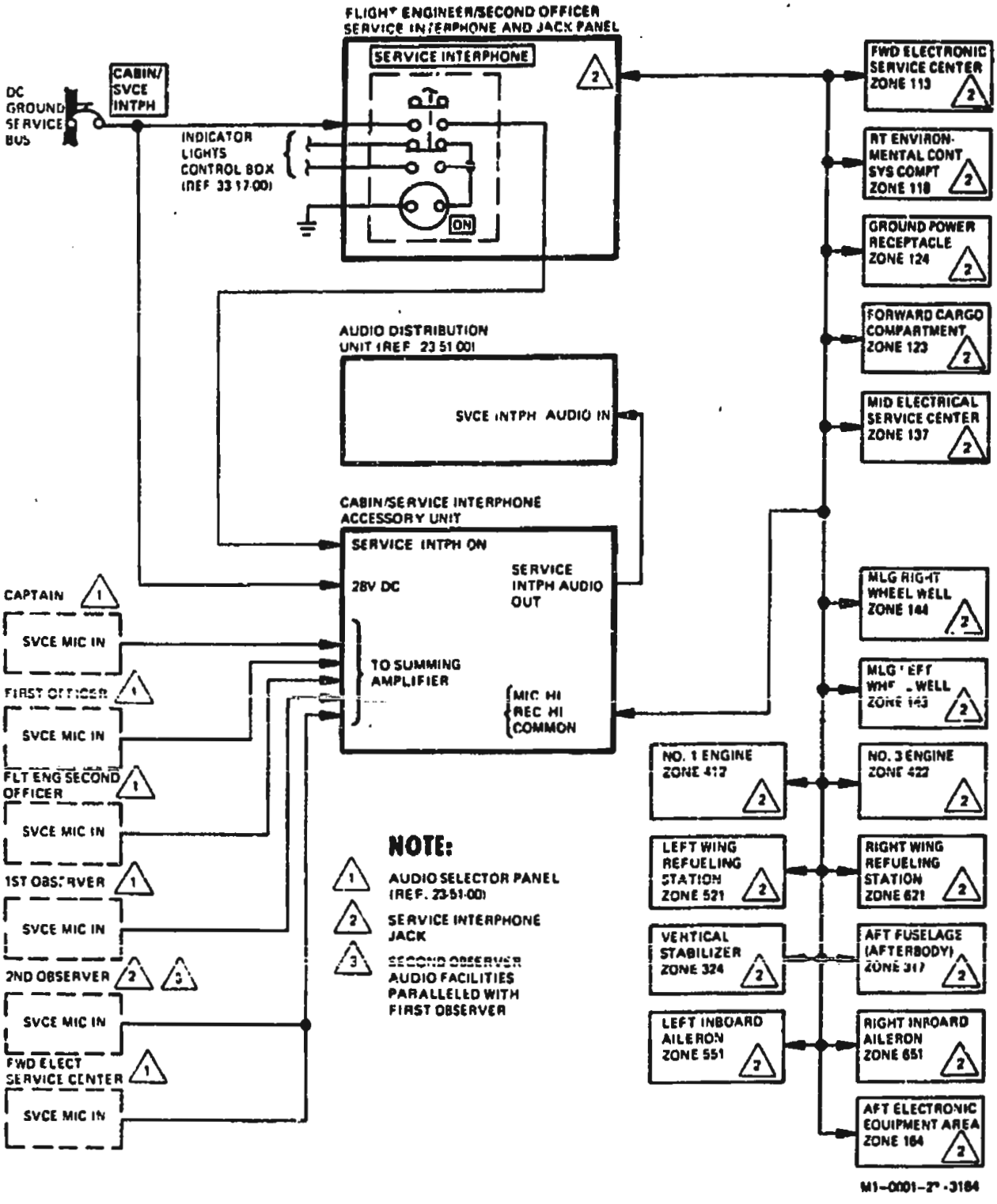
FLIGHT ENGINEER/SECOND OFFICERS
SERVICE INTERPHONE AND JACK PANEL

D

CABIN/SERVICE
INTERPHONE
ACCESSORY UNIT

M1-92000-23-3163

R Service Interphone System Equipment and Location
R Figure 1 (Sheet 2)


FLIGHT ENGINEER/SECOND OFFICER SERVICE INTERPHONE AND JACK PANEL
SERVICE INTERPHONE
ON
DC GROUND SERVICE BUS
CABIN/ SVCE INTPH
INDICATOR LIGHTS CONTROL BOX (REF 33 17 00)
AUDIO DISTRIBUTION UNIT (REF 23 51 00)
SVCE INTPH AUDIO IN
CABIN/SERVICE INTERPHONE ACCESSORY UNIT
SERVICE INTPH ON
28V DC
SERVICE INTPH AUDIO OUT
TO SUMMING AMPLIFIER
MIC HI
REC HI
COMMON
CAPTAIN
SVCE MIC IN
FIRST OFFICER
SVCE MIC IN
FLT ENG SECOND OFFICER
SVCE MIC IN
1ST OBSERVER
SVCE MIC IN
2ND OBSERVER
SVCE MIC IN
FWD ELECT SERVICE CENTER
SVCE MIC IN
NOTE:
1 AUDIO SELECTOR PANEL (REF. 23-51-00)
2 SERVICE INTERPHONE JACK
3 SECOND OBSERVER AUDIO FACILITIES PARALLELED WITH FIRST OBSERVER
FWD ELECTRONIC SERVICE CENTER ZONE 113
RT ENVIRONMENTAL CONT SYS COMPT ZONE 118
GROUND POWER RECEPTACLE ZONE 124
FORWARD CARGO COMPARTMENT ZONE 123
MID ELECTRICAL SERVICE CENTER ZONE 137
MLG RIGHT WHEEL WELL ZONE 144
MLG LEFT WHEEL WELL ZONE 143
NO. 1 ENGINE ZONE 412
NO. 3 ENGINE ZONE 422
LEFT WING REFUELING STATION ZONE 521
RIGHT WING REFUELING STATION ZONE 621
VERTICAL STABILIZER ZONE 324
AFT FUSELAGE (AFTERBODY) ZONE 317
LEFT INBOARD AILERON ZONE 551
RIGHT INBOARD AILERON ZONE 651
AFT ELECTRONIC EQUIPMENT AREA ZONE 164
M1-0001-2*-3184

R R Service Interphone System Block Diagram
Figure 2

R EFFECTIVITY: 032-999

cabin/service interphone accessory unit and the switchlight illuminates. In the energized position, relay K1 connects the service interphone jacks to the summing amplifier. Interphone audio from the audio selector panels (if selected) are also applied to the summing amplifier. The summing amplifier output is amplified and routed to the service interphone jack circuits,
R the audio selector panels and the cabin interphone handsets. When the SERVICE INTERPHONE ON switchlight is released, relay K1 de-energizes and the service interphone circuit is disconnected.

3. Cabin Service Interphone Accessory Unit

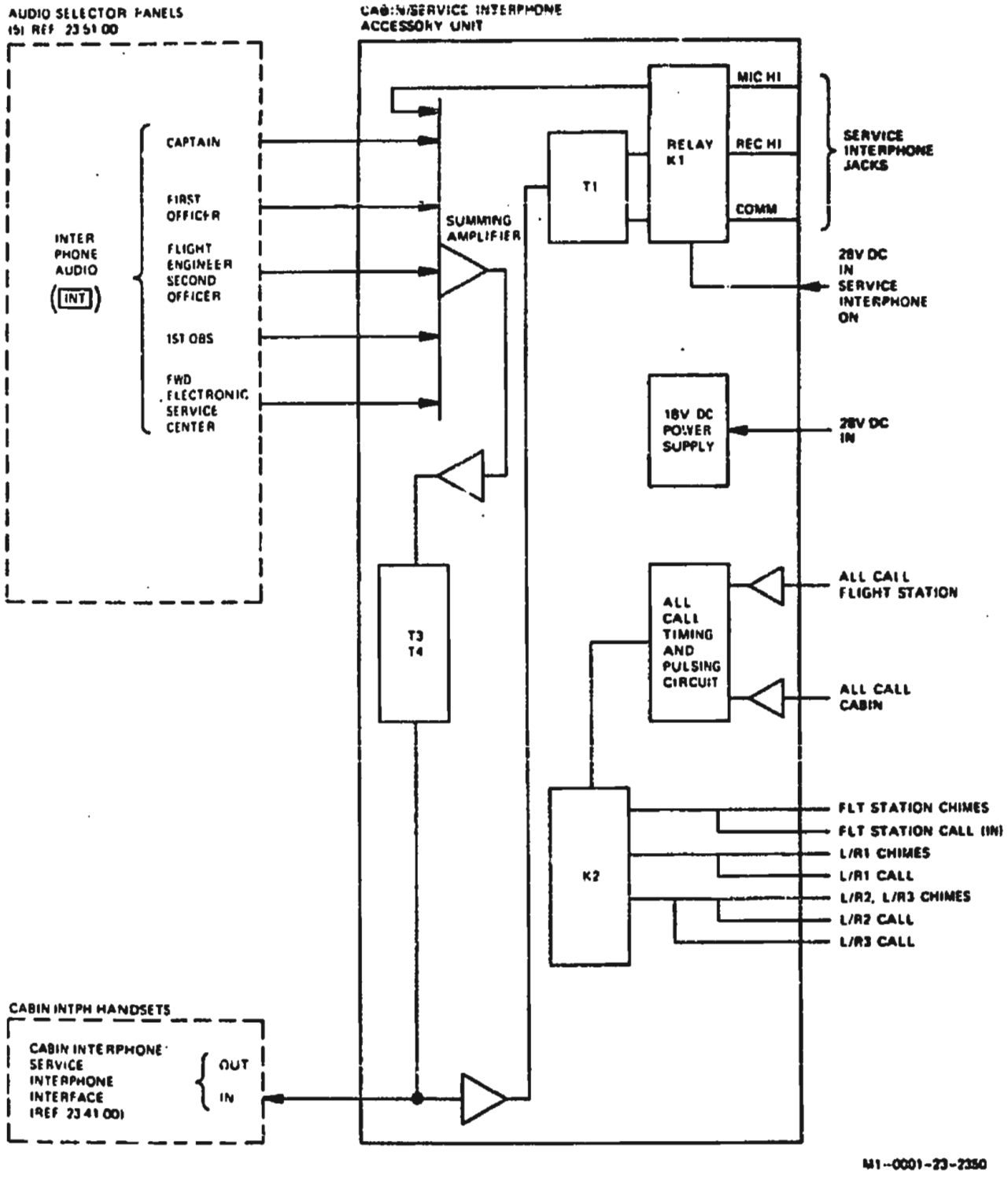
A. Description

The cabin/service interphone accessory unit is a solid state, rack mounted unit. The major subassemblies are a summing network, a power supply, two amplifiers, two relays, a chime and call circuit and isolation transformers (Ref. Fig. 3). The cabin/service interphone accessory unit provides operating power to the service and cabin interphone systems, interfaces the service and cabin interphone systems with the flight interphone and audio integrating systems, and provides signals to the electronic chime speakers and call lights during all call and station calls.

B. Operation

Depressing the SERVICE INTERPHONE ON switchlight causes relay K1 to energize. 18V dc operating power is supplied to the service interphone system. K1 also couples MIC audio from all service interphone jacks to the summing amplifier where it is amplified with MIC audio inputs (if selected) from the audio selector panels. The output of the summing amplifier is jumpered across pins 38 and 36, amplified and supplied to T3. The secondary of T3 supplies audio to the cabin handsets and the flight station interphone panel. T3 is also connected to T4. The secondary of T4 is amplified and supplied to the primary of T1. T1 supplies audio out to all service interphone jacks.

Signal flow for the cabin interphone is the same as the service interphone, except that K1 is de-energized, and service interphone audio in or out is disconnected.



Service Interphone Accessory Unit Block Diagram
Figure 3

EFFECTIVITY: 032-999

SERVICE INTERPHONE SYSTEM - FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 lists the fault isolation diagrams and schematics in this section.

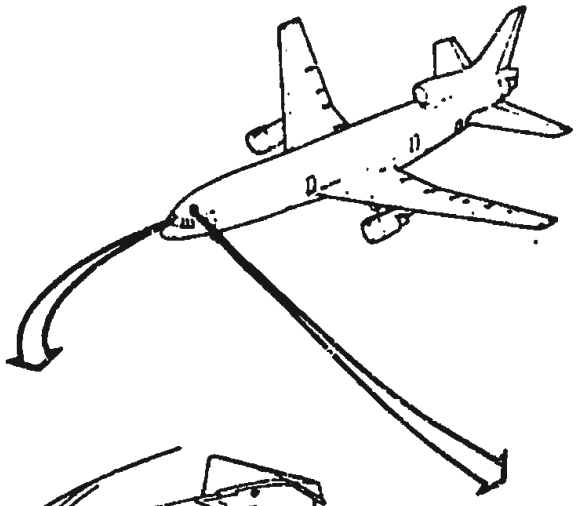
TABLE 101

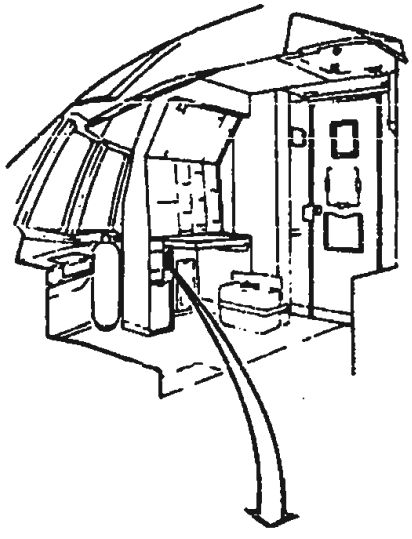
FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Service Interphone Positions Do Not Intercommunicate
SCHEM 1	Service Interphone System Schematic

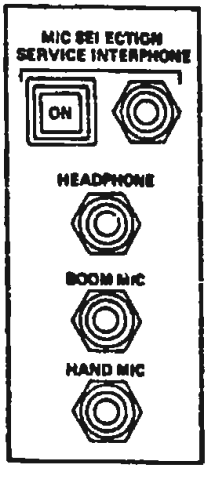
COMPONENT	QTY	AREA/ACCESS	REFERENCE
AMPLIFIER – INTERPHONE	1	FESC, REAR RACK; 112AB, 211CB	23-43-01
AUDIO DISTRIBUTION UNIT	1	FESC, REAR RACK; 112AB	23-51-03
CIRCUIT BREAKER – L1	1	FE/SO OVHD CB PNL CB2	20-24-05
CONTROL UNIT – FLIGHT STATION CABIN INTERPHONE	1	PILOTS OVHD CONTROL PNL	23-41-03
JACK – SERVICE INTERPHONE HEADSET	17	23-43-00 FIGURE 1	20-24-01
PANEL – AUDIO SELECTOR:			
CAPTAIN	1	PILOTS CENTER CONSOLE	23-51-04
FO	1	PILOT CENTER CONSOLE	23-51-04
FE/SO	1	FE/SO AUXILIARY PNL	23-51-04
FIRST OBSERVER	1	CAPTAINS SIDE CONSOLE	23-51-04
FESC	1	FESC; 112AB	23-51-04
SWITCHLIGHT – SERVICE INTERPHONE	1	FE/SO MIC SELECTION PANEL ZONE 215	23-51-04

M1-0000-23-3482

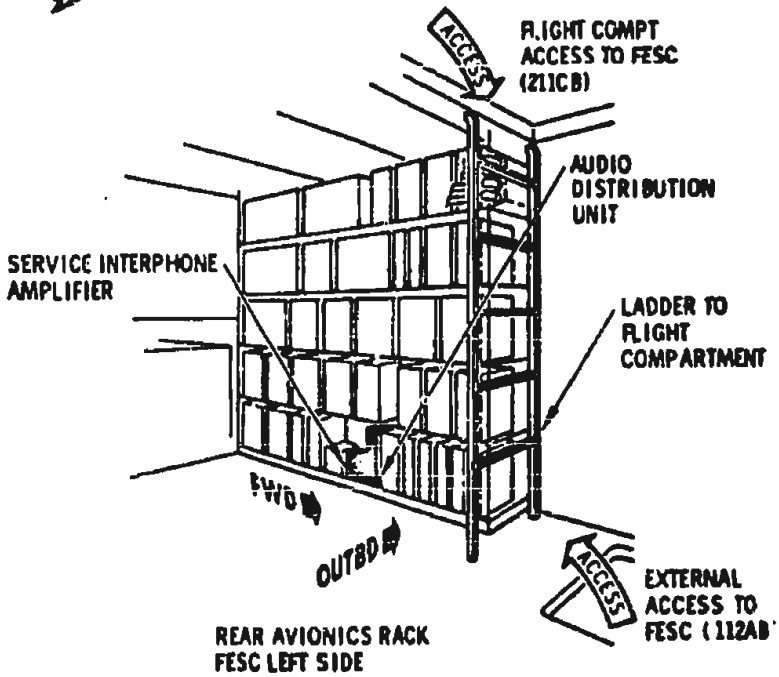
Component Location Index
Figure 101







FE/SO SERVICE INTERPHONE AND JACK PANEL



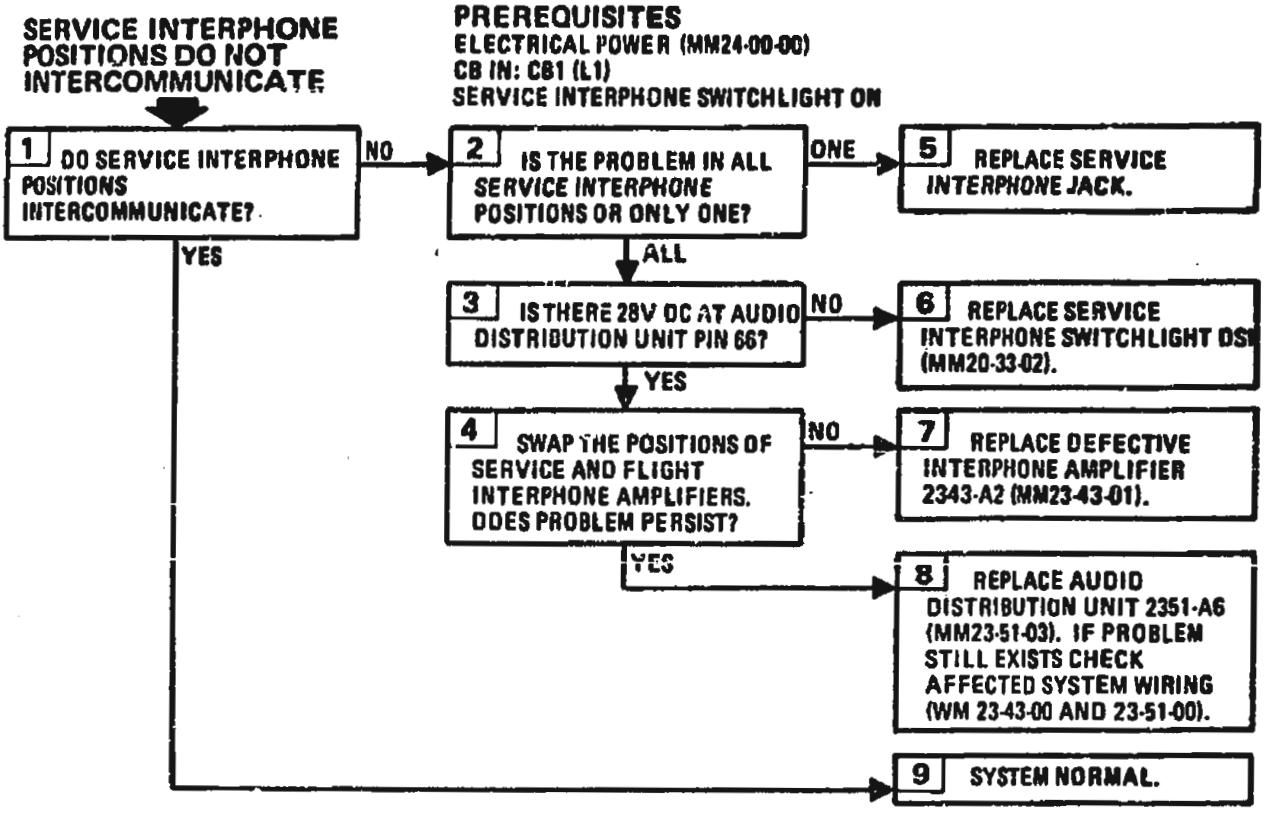
REAR AVIONICS RACK
FESC LEFT SIDE

M1-0000-23-3518

Component Locator Diagram
Figure 102

EFFECTIVITY: 001-031

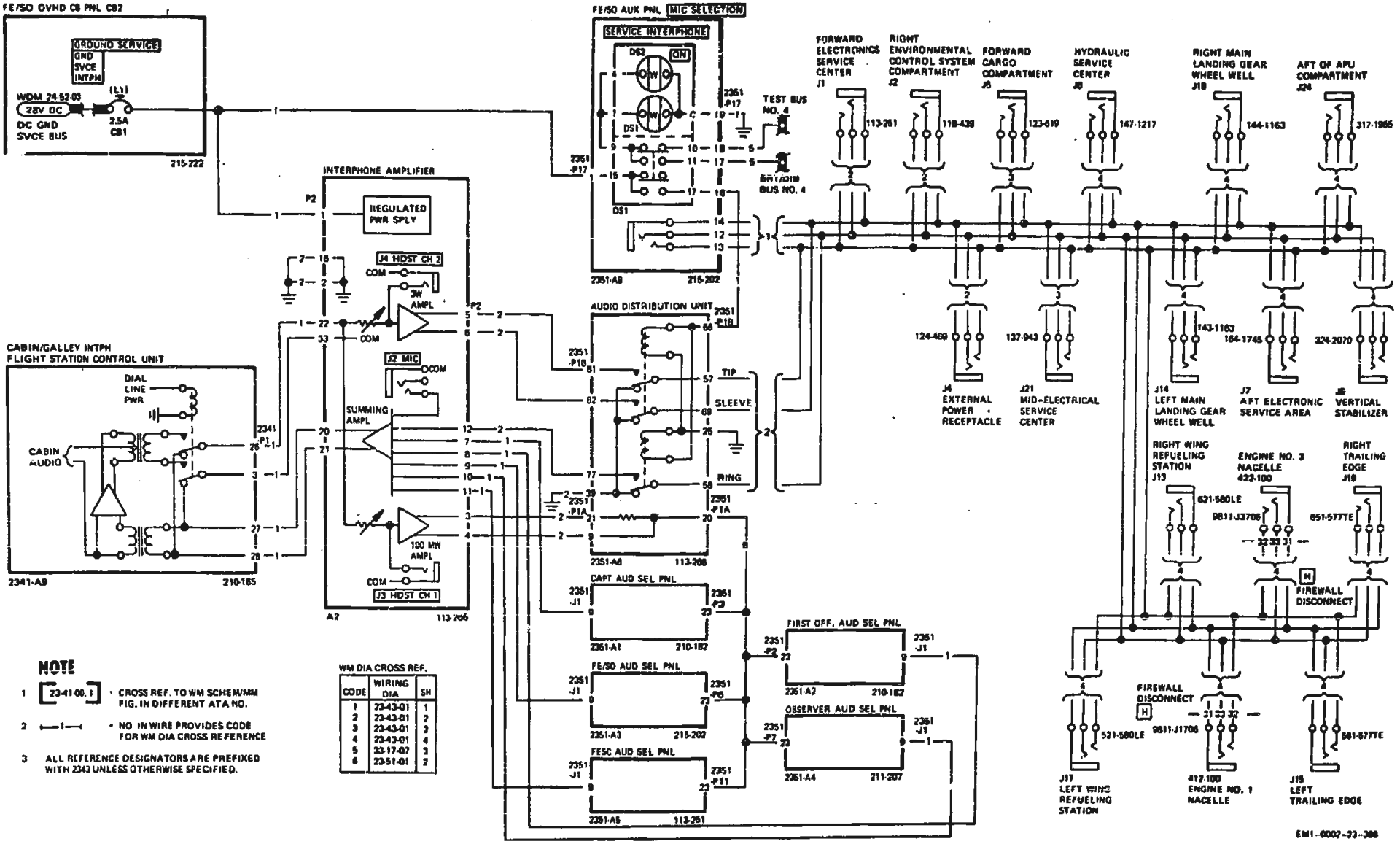
0018


SERVICE INTERPHONE POSITIONS DO NOT INTERCOMMUNICATE
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: CB1 (L1)
SERVICE INTERPHONE SWITCHLIGHT ON
1 DO SERVICE INTERPHONE POSITIONS INTERCOMMUNICATE?
NO
2 IS THE PROBLEM IN ALL SERVICE INTERPHONE POSITIONS OR ONLY ONE?
ONE
5 REPLACE SERVICE INTERPHONE JACK.
YES
ALL
3 IS THERE 28V DC AT AUDIO DISTRIBUTION UNIT PIN 66?
NO
6 REPLACE SERVICE INTERPHONE SWITCHLIGHT DS (MM20-33-02).
YES
4 SWAP THE POSITIONS OF SERVICE AND FLIGHT INTERPHONE AMPLIFIERS. DOES PROBLEM PERSIST?
NO
7 REPLACE DEFECTIVE INTERPHONE AMPLIFIER 2343-A2 (MM23-43-01).
YES
8 REPLACE AUDIO DISTRIBUTION UNIT 2351-A6 (MM23-51-03). IF PROBLEM STILL EXISTS CHECK AFFECTED SYSTEM WIRING (WM 23-43-00 AND 23-51-00).
9 SYSTEM NORMAL.

NOTE
DETERMINE THAT HEADSETS ARE GOOD PRIOR TO STARTING FAULT ISOLATION.

M1-0000-23-3519

Service Interphone Positions Do Not Intercommunicate
Figure 103



Service Interphone System Schematic
SCHEM 1

EFFECTIVITY: 001-031

R SERVICE INTERPHONE SYSTEM - FAULT ISOLATION

R General

R The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 lists the fault isolation diagrams and schematics in this section.

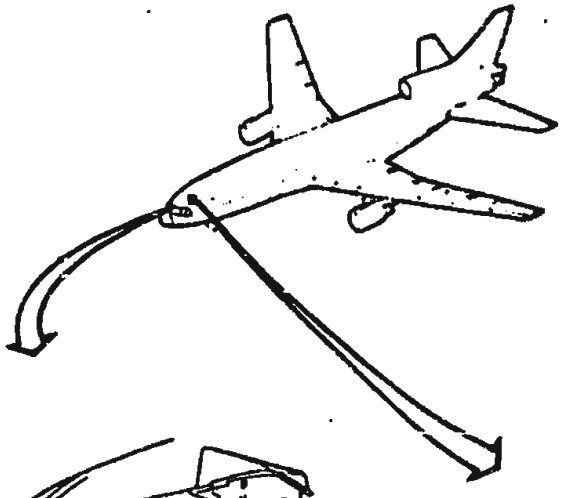
FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Service Interphone Positions Do Not Intercommunicate
104	Audio Selector Panel Not Available Thru Service Interphone Positions
105	Service Interphone Audio Not Available Thru Audio Selector Panel
SCHEM 1	Service Interphone System Schematic

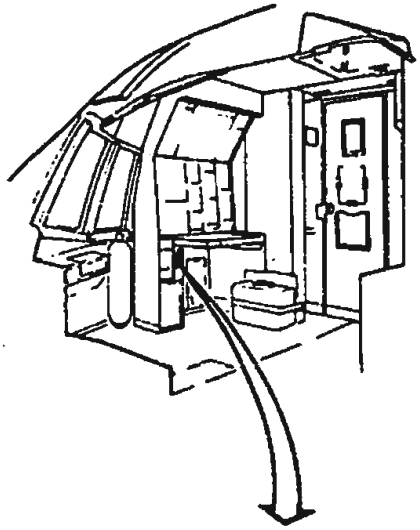
COMPONENT	QTY	AREA/ACCESS	REFERENCE
AUDIO DISTRIBUTION UNIT	1	FESC; 112AB, 211CB	23-51-03
CABIN/SERVICE INTERPHONE ACCESSORY UNIT	1	FESC; 112AB, 211CB	23-41-17
CIRCUIT BREAKER – CABIN/SVCE INTPH (CB2)	1	FE/SO OVHD CB2 PNL (L7), 210	20-24-05
JACK – SERVICE INTERPHONE	16	FIGURE 1	23-43-00
PANELS – AUDIO SELECTOR:			
CAPT, FIRST OFF, FE/SO, 1ST OBSERVER	4	FLIGHT STATION	23-51-04
FESC	1	FESC; 112AB, 211CB	23-51-04
SWITCHLIGHT – SERVICE INTERPHONE	1	FE/SO JACK PANEL	20-33-02

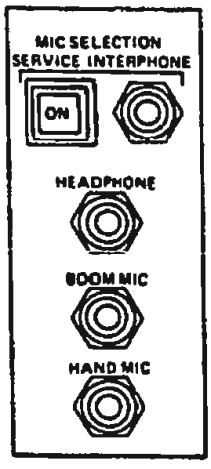
M1-0000-23-3371

R
R Component Location Index
Figure 101

R EFFECTIVITY: 032-999
R
R
R
002B

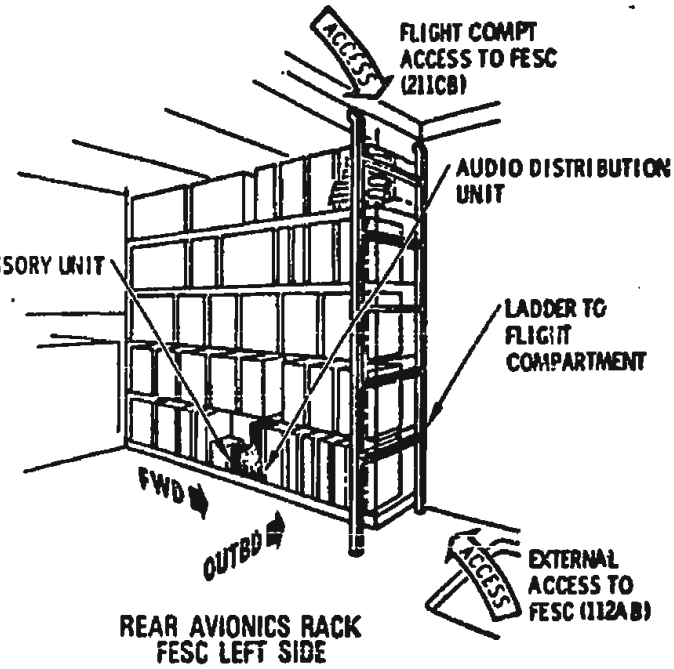






FE/SO SERVICE INTERPHONE AND JACK PANEL

CABIN/SERVICE INTERPHONE ACCESSORY UNIT

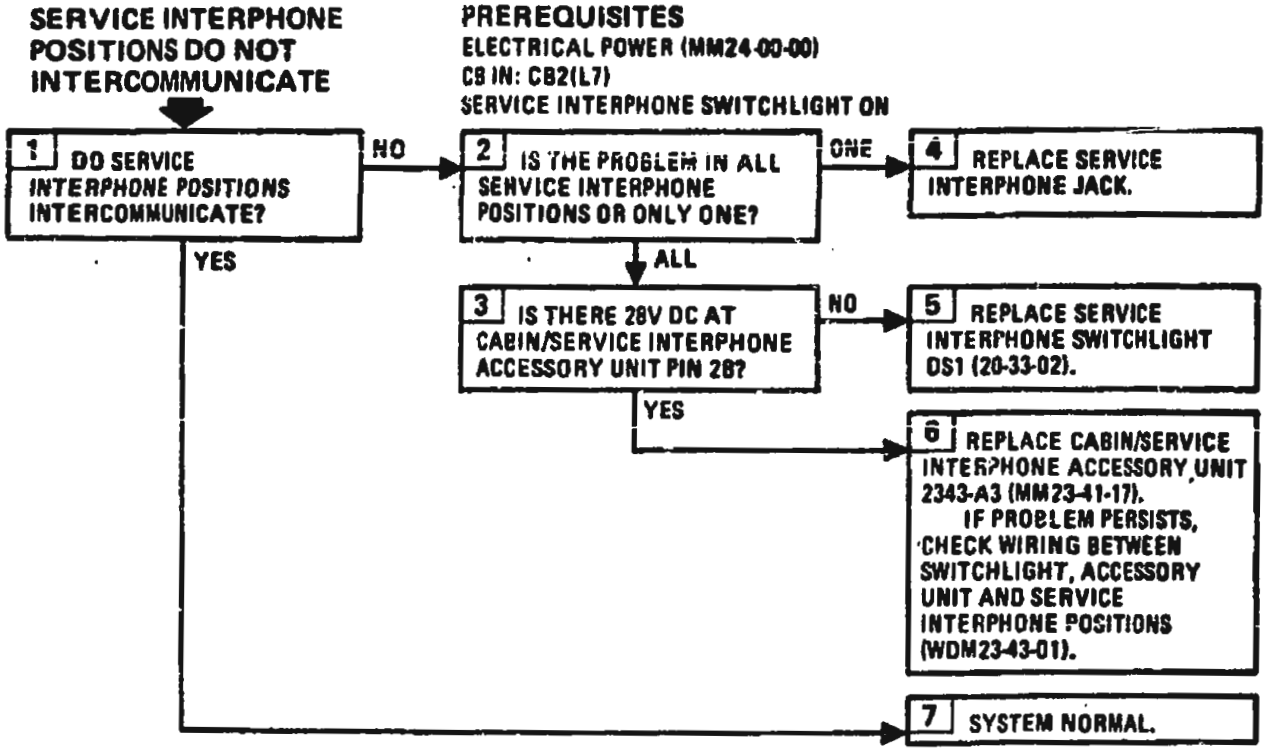


REAR AVIONICS RACK
FESC LEFT SIDE

M1-0000-23-3372

R
R Component Locator Diagram
Figure 102

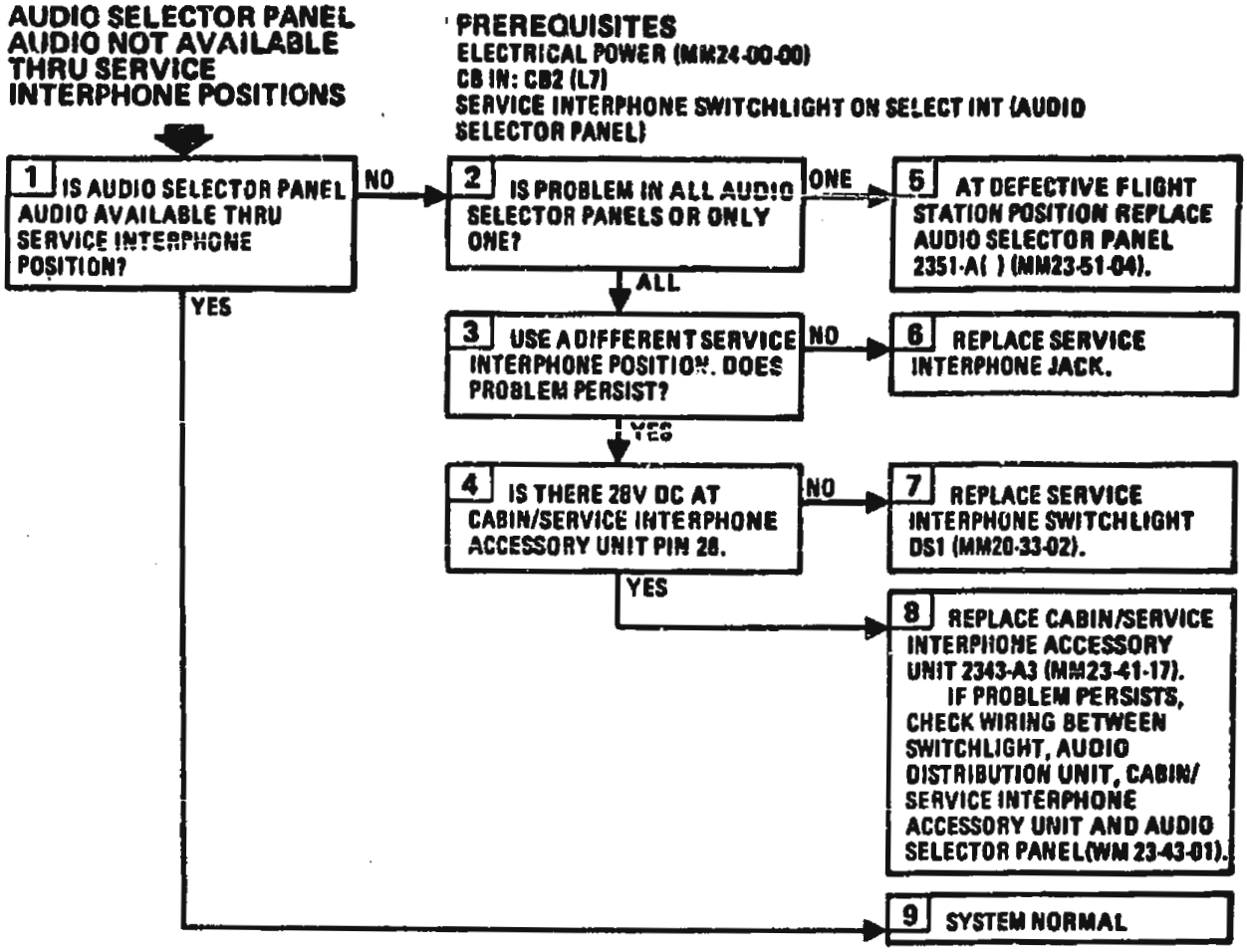
R EFFECTIVITY: 032-999


SERVICE INTERPHONE POSITIONS DO NOT INTERCOMMUNICATE
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: CB2(L7)
SERVICE INTERPHONE SWITCHLIGHT ON
1 DO SERVICE INTERPHONE POSITIONS INTERCOMMUNICATE?
NO
2 IS THE PROBLEM IN ALL SERVICE INTERPHONE POSITIONS OR ONLY ONE?
ONE
4 REPLACE SERVICE INTERPHONE JACK.
YES
ALL
3 IS THERE 28V DC AT CABIN/SERVICE INTERPHONE ACCESSORY UNIT PIN 28?
NO
5 REPLACE SERVICE INTERPHONE SWITCHLIGHT OS1 (20-33-02).
YES
6 REPLACE CABIN/SERVICE INTERPHONE ACCESSORY UNIT 2343-A3 (MM23-41-17). IF PROBLEM PERSISTS, CHECK WIRING BETWEEN SWITCHLIGHT, ACCESSORY UNIT AND SERVICE INTERPHONE POSITIONS (WDM23-43-01).
7 SYSTEM NORMAL.

M1-0000-23-3373

R R Service Interphone Positions Do Not Intercommunicate
Figure 103

R EFFECTIVITY: 032-999
R R R
002B

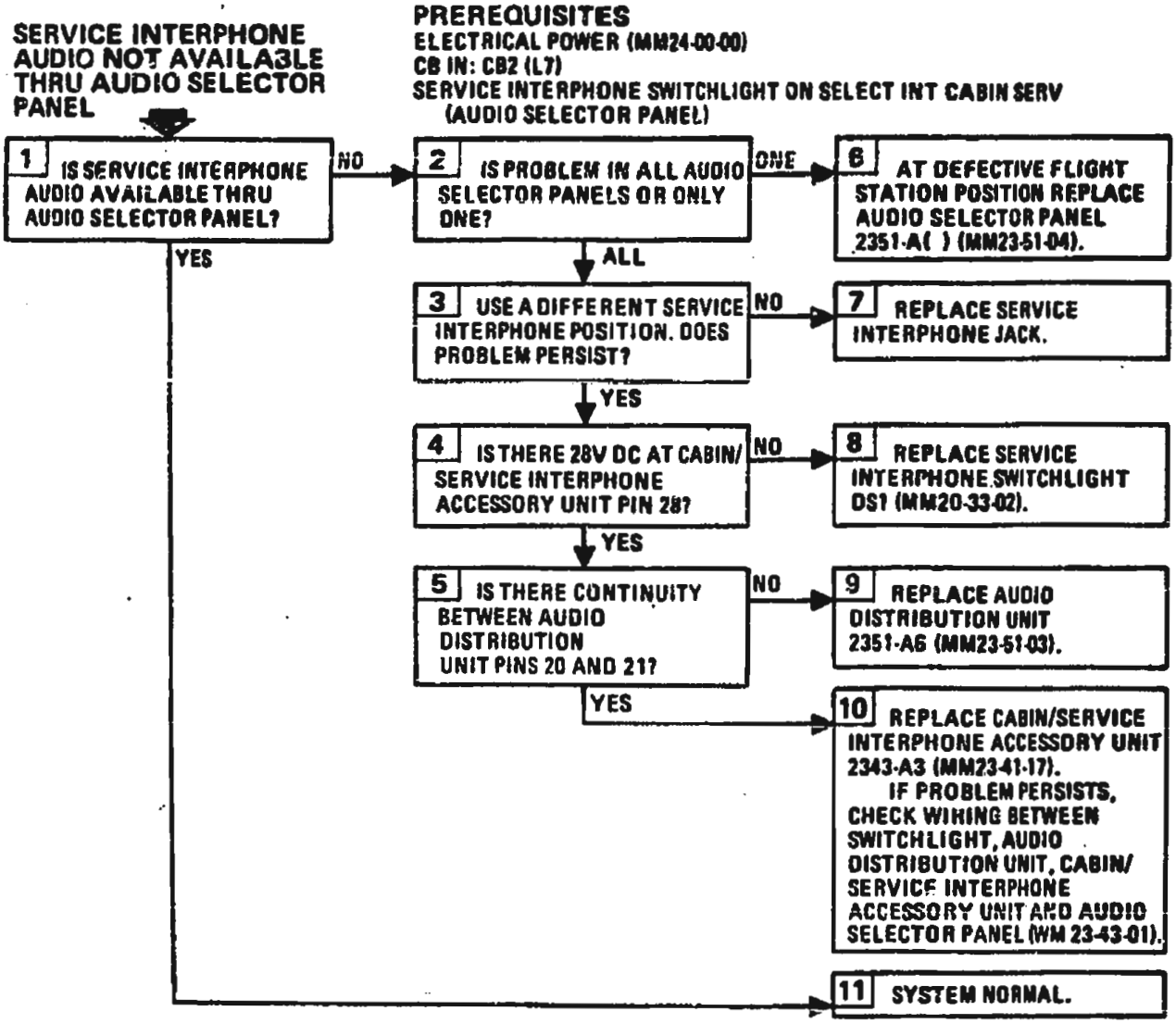

AUDIO SELECTOR PANEL AUDIO NOT AVAILABLE THRU SERVICE INTERPHONE POSITIONS
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: CB2 (L7)
SERVICE INTERPHONE SWITCHLIGHT ON SELECT INT (AUDIO SELECTOR PANEL)
1 IS AUDIO SELECTOR PANEL AUDIO AVAILABLE THRU SERVICE INTERPHONE POSITION?
NO
YES
2 IS PROBLEM IN ALL AUDIO SELECTOR PANELS OR ONLY ONE?
ONE
ALL
5 AT DEFECTIVE FLIGHT STATION POSITION REPLACE AUDIO SELECTOR PANEL 2351-A( ) (MM23-51-04).
3 USE A DIFFERENT SERVICE INTERPHONE POSITION. DOES PROBLEM PERSIST?
NO
YES
6 REPLACE SERVICE INTERPHONE JACK.
4 IS THERE 28V DC AT CABIN/SERVICE INTERPHONE ACCESSORY UNIT PIN 28.
NO
YES
7 REPLACE SERVICE INTERPHONE SWITCHLIGHT DS1 (MM20-33-02).
8 REPLACE CABIN/SERVICE INTERPHONE ACCESSORY UNIT 2343-A3 (MM23-41-17). IF PROBLEM PERSISTS, CHECK WIRING BETWEEN SWITCHLIGHT, AUDIO DISTRIBUTION UNIT, CABIN/SERVICE INTERPHONE ACCESSORY UNIT AND AUDIO SELECTOR PANEL (WM 23-43-01).
9 SYSTEM NORMAL

M1-0000-23-3374

R Audio Selector Panel Audio Not Available Thru Service Interphone
R Positions
R Figure 104

R EFFECTIVITY: 032-999

002B

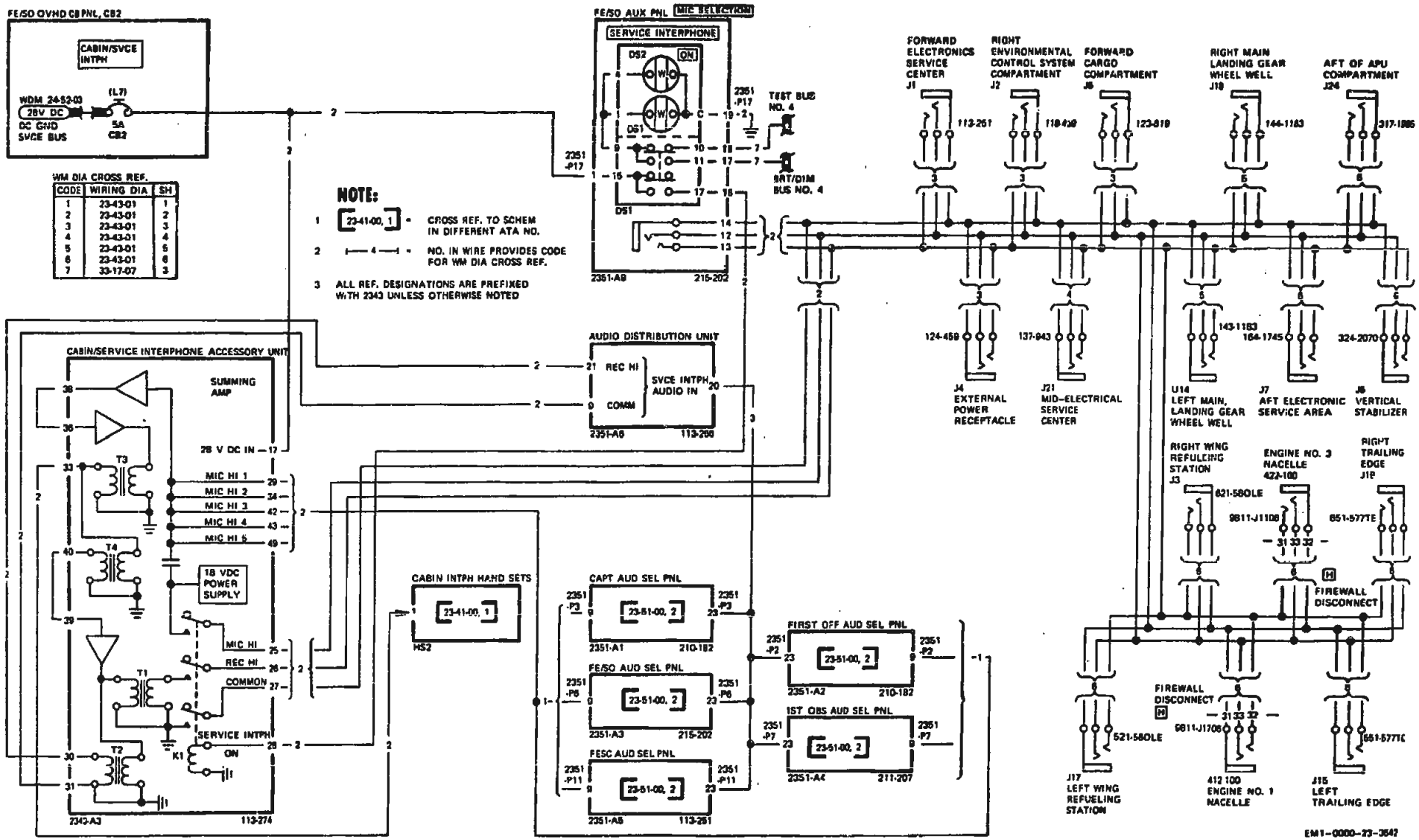

SERVICE INTERPHONE AUDIO NOT AVAILABLE THRU AUDIO SELECTOR PANEL
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB IN: CB2 (L7)
SERVICE INTERPHONE SWITCHLIGHT ON SELECT INT CABIN SERV (AUDIO SELECTOR PANEL)
1 IS SERVICE INTERPHONE AUDIO AVAILABLE THRU AUDIO SELECTOR PANEL?
NO
YES
2 IS PROBLEM IN ALL AUDIO SELECTOR PANELS OR ONLY ONE?
ONE
ALL
6 AT DEFECTIVE FLIGHT STATION POSITION REPLACE AUDIO SELECTOR PANEL 2351-A( ) (MM23-51-04).
3 USE A DIFFERENT SERVICE INTERPHONE POSITION. DOES PROBLEM PERSIST?
NO
YES
7 REPLACE SERVICE INTERPHONE JACK.
4 IS THERE 28V DC AT CABIN/ SERVICE INTERPHONE ACCESSORY UNIT PIN 28?
NO
YES
8 REPLACE SERVICE INTERPHONE SWITCHLIGHT DS1 (MM20-33-02).
5 IS THERE CONTINUITY BETWEEN AUDIO DISTRIBUTION UNIT PINS 20 AND 21?
NO
YES
9 REPLACE AUDIO DISTRIBUTION UNIT 2351-A6 (MM23-51-03).
10 REPLACE CABIN/SERVICE INTERPHONE ACCESSORY UNIT 2343-A3 (MM23-41-17).
IF PROBLEM PERSISTS, CHECK WIRING BETWEEN SWITCHLIGHT, AUDIO DISTRIBUTION UNIT, CABIN/ SERVICE INTERPHONE ACCESSORY UNIT AND AUDIO SELECTOR PANEL (WM 23-43-01).
11 SYSTEM NORMAL.

M1-0000-23-3375

R Service Interphone Audio Not Available Thru Audio Selector Panel
R Figure 105

R EFFECTIVITY: 032-999

002B



Service Interphone System Schematic
SCHEM 1

EFFECTIVITY: 032-999

SERVICE INTERPHONE SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-41-00	Cabin and Galley Interphone System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-00-00).

(2) Verify that cabin and galley interphone (Ref. 23-41-00), and audio integrating system (Ref. 23-51-00) are turned on.

(3) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, verify that GND SVCE INTPH (L1) circuit breaker is closed.

(4) Under FE/SO table, depress SERVICE INTERPHONE - ON switchlight.

(5) Connect service interphone handset and key microphone.

R (6) Speak into microphone and verify that sidetone audio is loud and clear.

R (7) Lift cabin and galley interphone handset from cradle on
R aft end of pilots center console.

R (8) Verify that audio is loud and clear between service
R interphone and cabin and galley interphone.

R (9) Forward of table at FE/SO audio selector panel, depress MIC SEL - INT and INT CABIN/SERV. Adjust volume as necessary.

R (10) Key FE/SO hand-held microphone, and verify that audio is loud and clear between service interphone and audio integrating system.

(11) At following SERVICE INTERPHONE jacks, plug in service interphone handset and check that sidetone audio is loud and clear:

(a) Forward electronics service center on flight station door surround, zone 113

(b) Right environmental control system compartment aft bulkhead, just inside door at middle of frame, zone 118

(c) External power receptacle aft of the receptacle above access door 124AB, zone 124

(d) Forward cargo compartment on the door frame above the cargo loading controller, zone 121

(e) Mid electrical service center on galley door frame outboard edge, about half-way up door frame near service light switch, zone 137

R (f) On aircraft 001-014, and 015-031 without SB28-036 hydraulic service center at forward end of compartment, on upper left corner of hydraulic service panel, zone 147

(g) By main landing gear just forward of inboard doors (two jacks), on left and right landing gear door ground release service panels (same access doors), zones 143 and 144

(h) Aft electronic service area outboard of voice recorder on triangular panel, zone 164

(i) On the bottom of the afterbody just aft of the APU compartment just left of the fuselage centerline above the No. 2 engine compartment service light handle (door 318BB), zone 318

(j) Vertical stabilizer on aft edge of stabilizer box section, near top of rudder bottom hinge by rudder servo (doors 324AL/AR), zone 324

(k) Left and right wings just outboard of refueling stations (two jacks), on same panel as refueling grounding jacks, above access doors 521GB-1 and 621GB-1, zones 521 and 621

(l) No. 1 and 3 engine nacelles (if installed - two jacks), left side of nacelle forward outer surface about 5 feet above ground level (doors 411SL and 421SL), zones 411 and 421

R **NOTE:** There are two service interphone jacks by the left and right wing inboard aileron servos, one each above access panels 551BB and 651BB. These jacks are used only when the access panels are opened for servo maintenance, and they need not be tested to verify service interphone operation.

R (12) Turn off service interphone (release SERVICE INTERPHONE switchlight under FE/SO table).

R (13) Close all access panels and doors opened for test.

R (14) Turn off electrical power (Ref. 24-00-00).

SERVICE INTERPHONE SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-41-00	Cabin Interphone System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-00-00).

(2) Verify that cabin interphone (Ref. 23-41-00), and audio integrating system (Ref. 23-51-00) are turned on.

(3) On Flight Engineer/Second Officers (FE/SO) overhead circuit breaker panel CB2, zone 215, verify that
R CABIN/SVCE INTPH (L7) circuit breaker is closed.

(4) Under FE/SO table, depress SERVICE INTERPHONE - ON switchlight.

Connect service interphone handset and key microphone.

Speak into microphone and verify that sidetone audio is loud and clear.

(5) Lift cabin interphone handset from cradle on aft end of pilots center console (Ref. 23-41-00).

Verify that audio is loud and clear between service interphone and cabin interphone.

(6) Forward of table at FE/SO audio selector panel, depress
R MIC SEL - INT and INT CABIN/SERV audio control. Adjust volume as necessary.

Key FE/SO headset/boom microphone, and verify that audio is loud and clear between service interphone and audio integrating system.

(7) At following SERVICE INTERPHONE jacks, plug in service interphone handset and check that sidetone audio is loud and clear:

Forward electronics service center on flight station door surround, zone 113

Right environmental control system compartment aft bulkhead, just inside door at middle of frame, zone 118

R R Ground power receptacle aft of receptacle above access door 124AB, zone 124

R Forward cargo compartment on door frame above cargo loading controller, zone 123

Mid electrical service center on right side of forward bulkhead, zone 137

By main landing gear just forward of inboard doors (two jacks), on left and right landing gear door ground release service panels (same access doors), zones 143 and 144

Aft electronic service area outboard of voice recorder on triangular panel, zone 164

R R On bottom of afterbody just aft of APU compartment just left of fuselage centerline above No. 2 engine compartment service light handle (door 318BB), zone 317

Vertical stabilizer on aft edge of stabilizer box section, near top of rudder bottom hinge by rudder servo (doors 324AL/AR), zone 324

Left and right wings just outboard of refueling stations (two jacks), on same panel as refueling grounding jacks, above access doors 521GB-1 and 621GB-1, zones 521 and 621

No. 1 and 3 engine nacelles (if installed - two jacks), left side of nacelle forward outer surface about 5 feet above ground level (doors 411SL and 421SL), zones 411 and 421

NOTE: There are two service interphone jacks by the left and right wing inboard aileron servos, one each above access panels 5518B and 6518B. These jacks are used only when the access panels are opened for servo maintenance, and they need not be tested to verify service interphone operation.

(8) Turn off service interphone (release SERVICE INTERPHONE switchlight under FE/SO table), and electrical power (Ref. 24-00-00).

(9) Close all access panels and doors opened for test.

SERVICE INTERPHONE AMPLIFIER - REMOVAL AND INSTALLATION

1. Referenced Procedures

23-51-00 Audio Integrating System - Adjustment and Test

24-00-00 Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - GND SVCE INTPH (L1).

(2) Locate service interphone amplifier in forward electronic service center, zone 113, rear rack, shelf No. 1.

(3) Loosen knurled thumbscrew and disengage from mounting bracket at front of amplifier; remove amplifier (Ref. Fig. 401).

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Position amplifier in rack and secure with knurled thumbscrew (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step 2A(1).

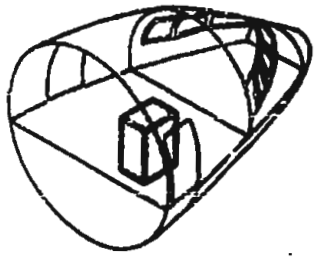
(4) Turn on electrical power (Ref. 24-00-00).

(5) Verify that audio integrating system is on (Ref. 23-51-00).

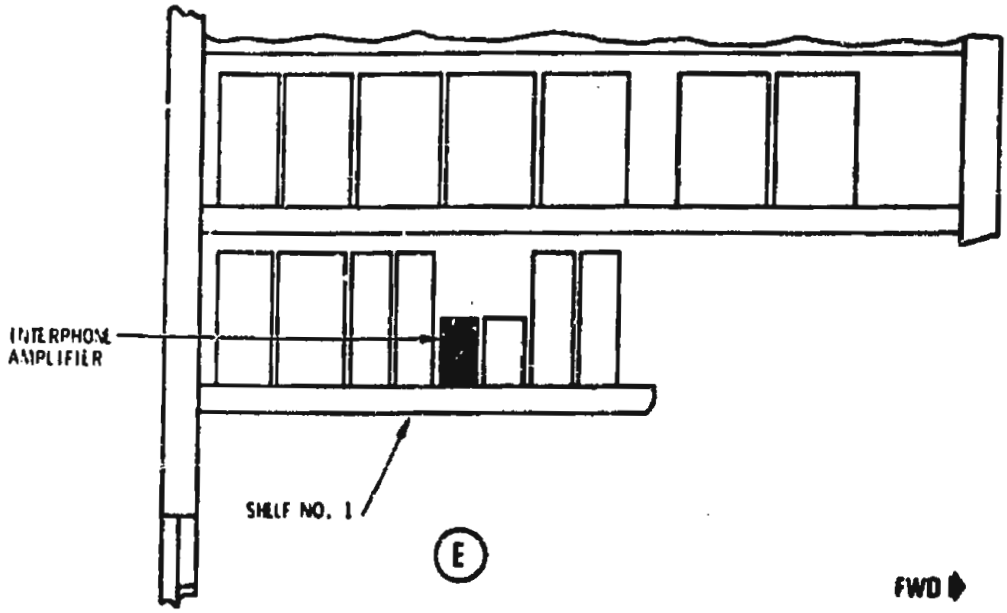
(6) At Flight Engineer/Second Officers position under forward edge of table, depress SERVICE INTERPHONE - ON switchlight.

R R (7) Connect service interphone handset to service interphone jack.

R (8) Key interphone handset and speak into microphone.



ZONE 113



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING FORWARD

M1-0101-23-414

Service Interphone Amplifier - Removal and Installation
Figure 401

R (9) Verify that sidetone audio is loud and clear.

R (10) On any flight station audio selector panel, depress MIC
R SEL INT and INT CABIN/SERV switches.

R (11) Turn INT CABIN/SERV audio control clockwise to increase
R audio level.

R (12) Key and speak into audio integrating system microphone.

R (13) Verify that audio is loud and clear in service
R interphone handset.

R (14) Release audio integrating system microphone key.

R (15) Speak into service interphone handset microphone.

R (16) Verify that audio is loud and clear in audio
R integrating system headset.

R (17) Release SERVICE INTERPHONE - ON switchlight and
R disconnect service interphone handset.

R (18) Turn off electrical power (Ref. 24-00-00).

PILOT/MECHANIC CALL SYSTEM - DESCRIPTION AND OPERATION

1. General

The pilot/mechanic call system provides the flight station crew and the ground crew with the means to alert each other for interphone contacts. The major system components and their locations are:

Horn and control switch - located in the nosewheel well, zone 114 (Ref. Fig. 1)

A GND CREW pushbutton switch = located on the flight station CABIN INTERPHONE panel, zone 210

Electronic chime speaker (Ref. 23-41-00) - located overhead in the flight station door entrance, zone 210

Power for the system is supplied by the 28V dc ground service bus through the MECH CALL (L2) circuit breaker on the Flight
R Engineer/Second Officers overhead circuit breaker panel CB2,
R zone 215.

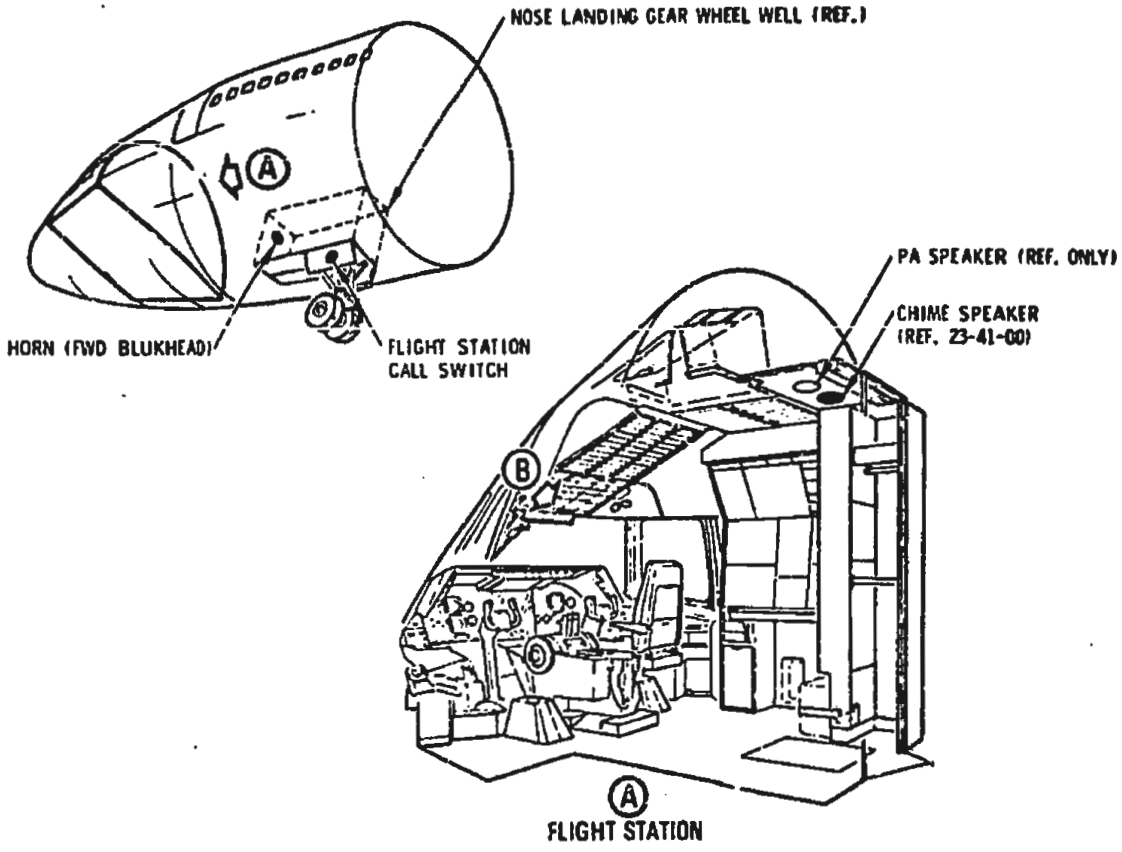
The ground crew can alert the flight station crew for an interphone call by pressing the SERVICE INTERPHONE - CALL switch on the nosewheel well door, which triggers the electronic chime speaker in the flight station to sound a low chime tone. The chime speaker also functions with the SELCAL system (Ref. 23-22-00) and the cabin and galley interphone system (Ref. 23-41-00). Refer to 23-41-00 for a detailed description of the chime speaker. The flight station crew can alert the ground crew for an interphone call by pressing the CALL - GND CREW switch in the flight station, which sounds the horn in the nosewheel well.

When the CALL - GND CREW switch (Ref. Fig. 2) is depressed, 28V dc (from the MECH CALL circuit breaker) is applied through the normally closed contacts of the SERVICE INTERPHONE - CALL switch to energize the nosewheel well horn. Pressing the SERVICE INTERPHONE - CALL switch applies 28V dc (from the MECH CALL circuit breaker) to the low-tone circuit of the chime speaker to trigger the low chime tone.

2. Horn

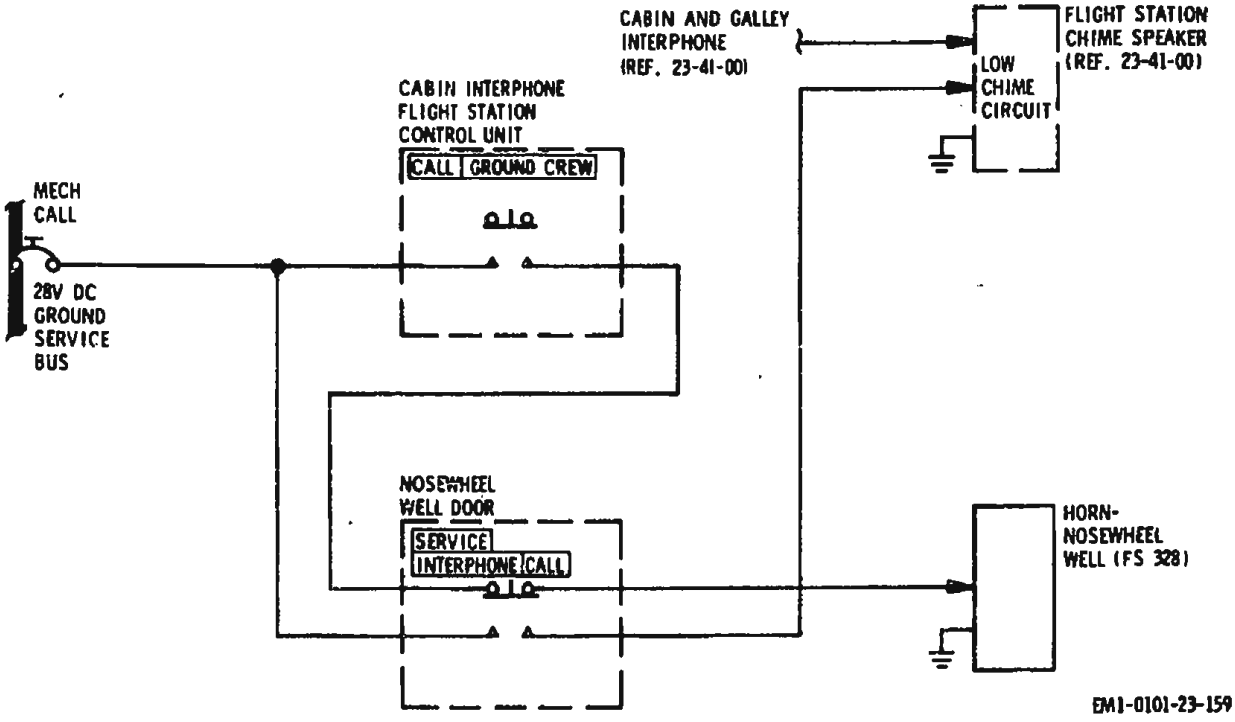
A. Description and Operation

The pilot/mechanic call system horn is a 28V dc electromagnetic vibrating-type unit rated at 0.5 ampere.



Pilot/Mechanic Call System Equipment and Location
Figure 1

The unit is housed in a pressed aluminum case with electrical connection made through a two-pin connector. Nominal sound output level of the horn is 100 decibels at a predominant tone frequency of 2700 (±500) Hz.



R Pilot/Mechanic Call System Block Diagram
R Figure 2

R # PILOT/MECHANIC CALL SYSTEM - FAULT ISOLATION

R 1. General

R The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 lists the fault isolation diagrams and schematics in this section.

R TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
SCHEM 1	Pilot/Mechanic Call System Electrical Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CHIME – FLIGHT STATION ELECTRONIC	1	FLIGHT STATION, OVHD	23-41-04
CIRCUIT BREAKER – GROUND SERVICE MECHANIC CALL	1	FE/SO OVHD CIRCUIT BREAKER PANEL CB2	20-24-05
CONTROL UNIT – FLIGHT STATION	1	PILOTS OVHD PANEL	23-41-03
HORN – NOSE WHEEL WELL	1	NOSE WHEEL WELL, FWD BULKHEAD	23-45-01
INTERPHONE AND CALL BOX - NOSE WHEEL WELL	1	NOSE WHEEL WELL	

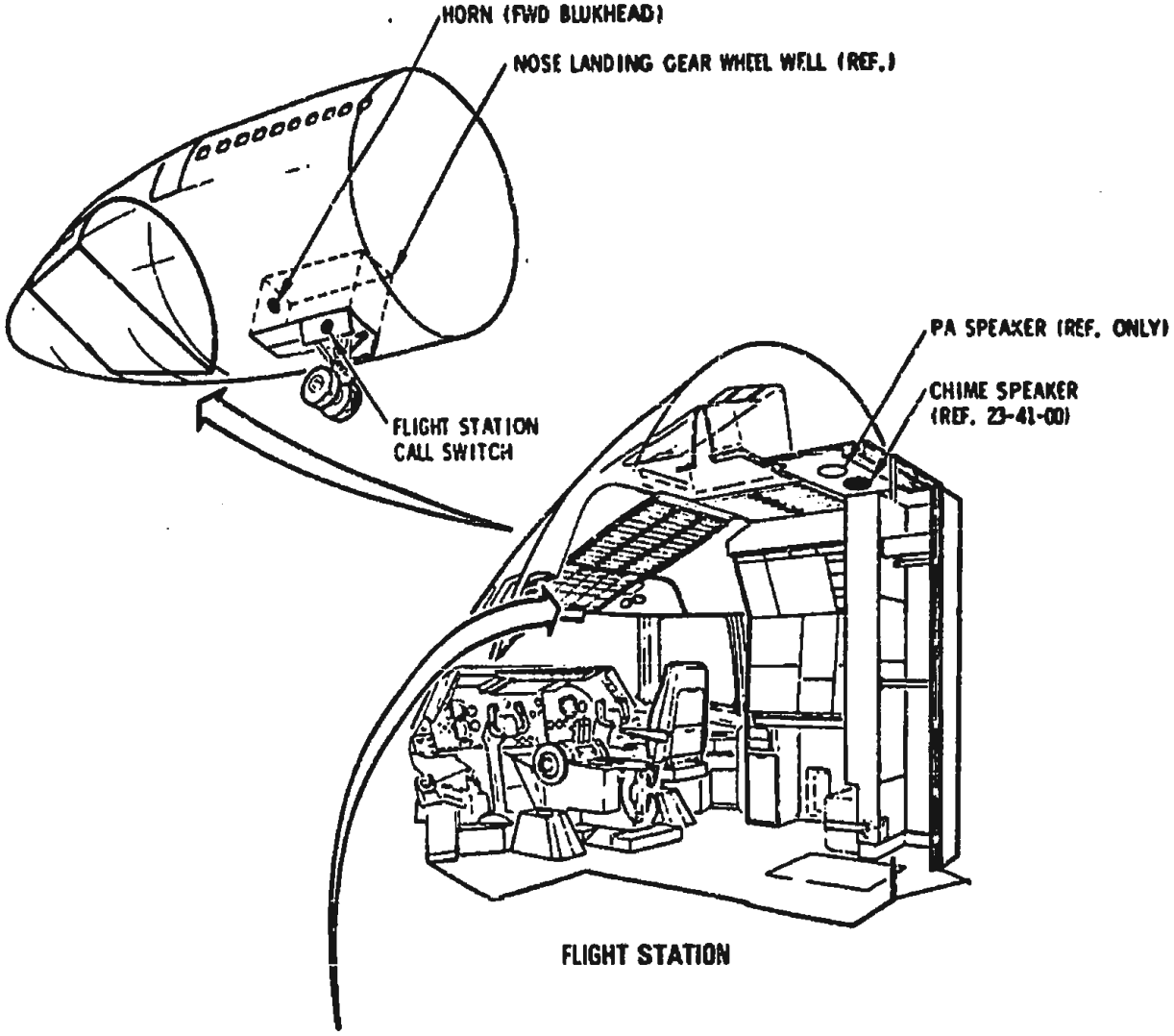
*SEE WM EQUIPMENT LIST

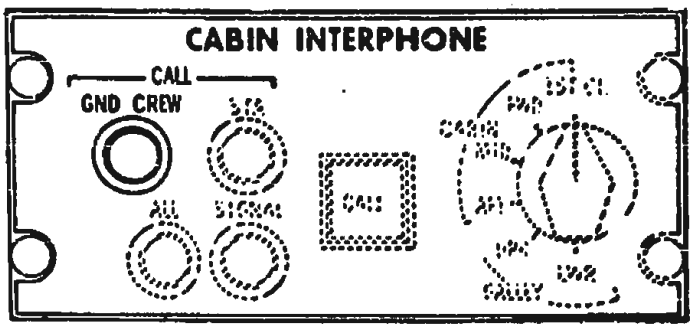
M1-0000-23-3480

R
R

Component Location Index
Figure 101

R EFFECTIVITY: ALL
R
R
001B



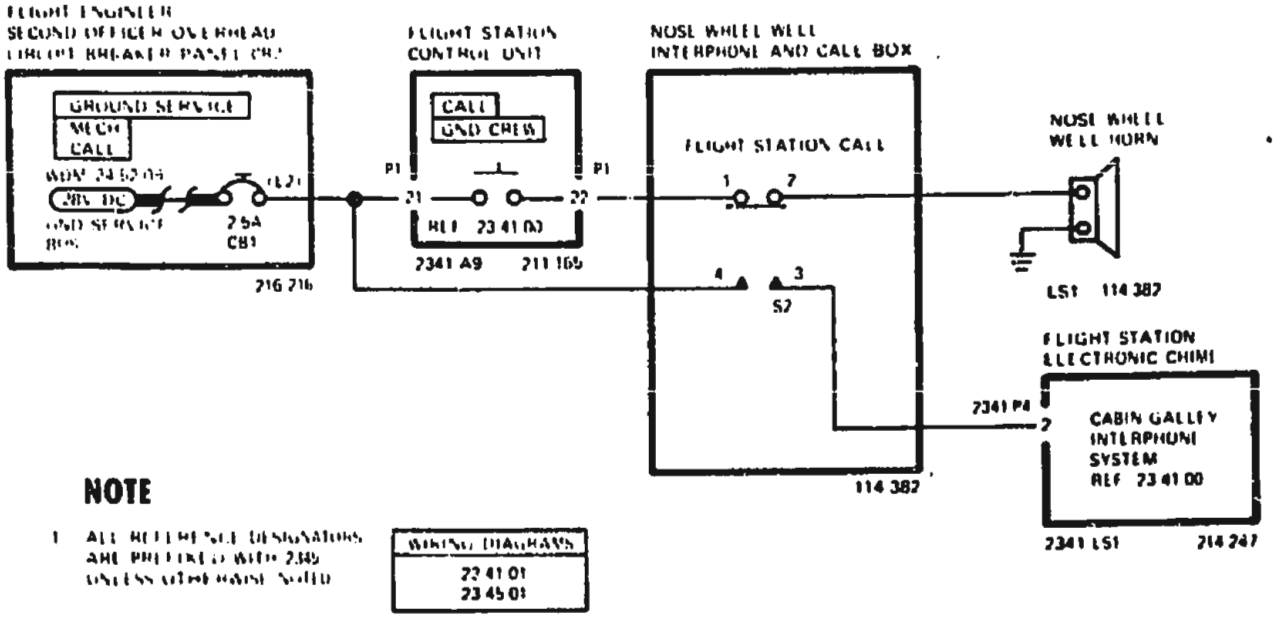


CABIN INTERPHONE PANEL

M1-0000-23-3481

R Component Locator Diagram
R Figure 102

R EFFECTIVITY: ALL
R
001B



NOTE

1 ALL REFERENCE DESIGNATIONS ARE PREFIXED WITH 2341 UNLESS OTHERWISE NOTED

WIRING DIAGRAMS
22 41 01
23 45 01

EMI 0101 23 354

R R Pilot/Mechanic Call System Schematic
SCHEM 1

R R 001B EFFECTIVITY: ALL

PILOT/MECHANIC CALL SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

23-41-00	Cabin and Galley Interphone System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breaker GROUND SERVICE - MECH CALL (L2) is closed.

R (3) Verify that cabin and galley interphone system is turned on (Ref. 23-41-00).

(4) On CABIN INTERPHONE panel in pilots overhead panel, depress CALL - GND CREW pushbutton switch.

(5) Verify that nosewheel well horn sounds loudly and clearly.

(6) On nosewheel well door, depress SERVICE INTERPHONE - CALL pushbutton switch. Verify that chime speaker in flight station sounds a low-tone signal.

(7) Turn off electrical power (Ref. 24-00-00).

HORN - REMOVAL AND INSTALLATION

1. Referenced Procedure

R 24-00-00 Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GROUND SERVICE - MECH CALL (L2).

R (2) On forward bulkhead in nosewheel well, remove mounting screws from horn (Ref. Fig. 401).

(3) Disconnect wires and remove horn.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

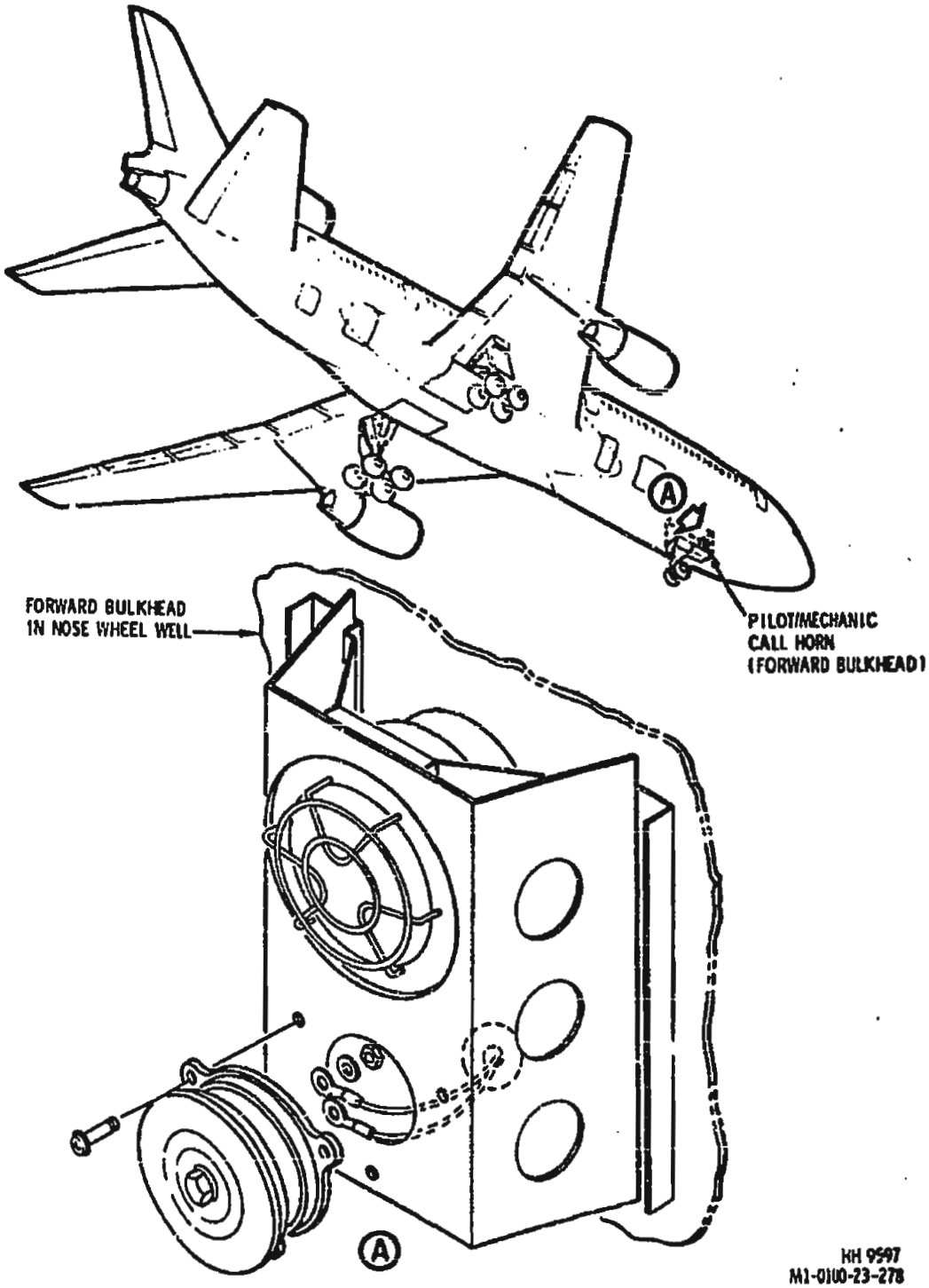
(2) Connect wires to horn and install mounting screws (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step 2A(1).

R (4) Turn on electrical power (Ref. 24-00-00).

R (5) On pilots overhead panel, zone 210, depress CALL - GND CREW switch on CABIN INTERPHONE panel and verify audible horn operation.

R (6) Turn off electrical power (Ref. 24-00-00).



R
R

Horn - Removal and Installation
Figure 401

AUDIO INTEGRATING SYSTEM - DESCRIPTION AND OPERATION

1. General

The audio integrating system provides the means for connecting flight station crewmember microphones and headsets to the interphone systems, the communications systems, and the navigation systems.

The system (Ref. Fig. 1) includes the following components:

A. Audio Selector Panels

R The Captains audio selector panel, on the left side of the pilots center console behind the throttles, zone 210

R The First Officers audio selector panel, on the right side of the pilots center console behind the throttles, zone 210

The Flight Engineer/Second Officers (FE/SO) audio selector panel, on the FE/SO auxiliary panel forward of the work table, zone 215

The Observers audio selector panel, on the Captains side console, zone 211

R An audio selector panel in the forward electronics service
R center, to the left of the flight station access door, in
R the door surround, zone 112

B. Audio Distribution Unit

An audio distribution unit in the forward electronics service center, rear rack bottom shelf, zone 113

C. Interphone Amplifier

An interphone amplifier (INTPH AMPL NO. 2) in the forward electronics service center, rear rack bottom shelf, zone 113

D. Headset Stowage and Microphone Selector Console Assemblies

R The Captains headset stowage and microphone selector console
R assembly on the Captains side console below the nose gear steering wheel, zone 211

The First Officers headset stowage and microphone selector console assembly on the First Officers side console forward of the oxygen bottle and mask stowage, zone 212

E. Microphone Selector and Jack Panel

The FE/SO microphone selector and jack panel on the aft part of the FE/SO auxiliary panel under the work table, zone 215

C F. Jack PanelsThe First Observers jack panel on the Captains
C side console, zone 211.

The Second Observers jack panel on the bottom of the oxygen mask stowage module above the Second Observers position, zone 211

A forward electronics service center jack panel to the left of the flight station access door, in the door surround below the audio selector panel, zone 112

A flight interphone jack on the nosewheel well interphone call box (on the nosewheel well left aft door), zone 114

G. Hand-held Microphones

Five hand-held microphones, one adjacent to each flight station crew position, zone 210

H. Oxygen Mask Microphones

R Five oxygen masks with integral microphones, stored in
R oxygen mask stowage modules as follows (Ref. Fig. 1 (Sheet 3):

The Captains side console

The First Officers side console

The forward part of the FE/SO console below the table

The bulkhead at the rear of the Captains side console to the left of the First Observers position

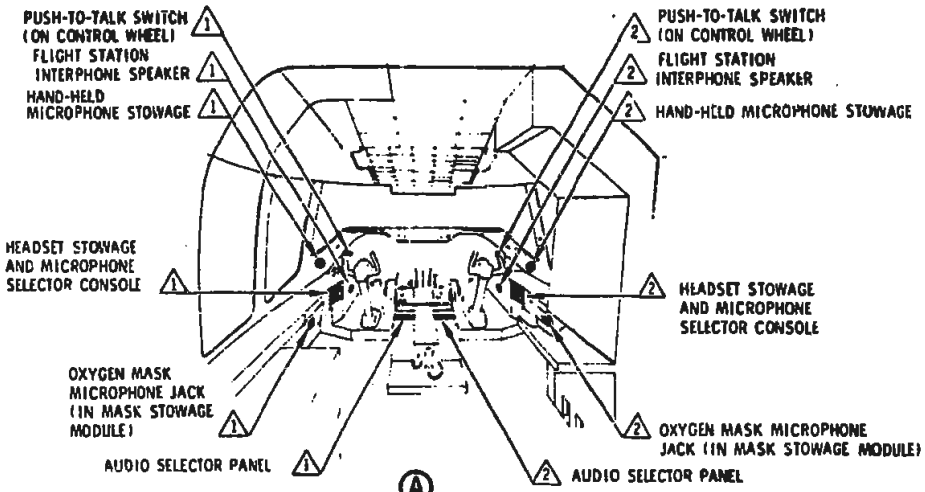
Above the Second Observers position

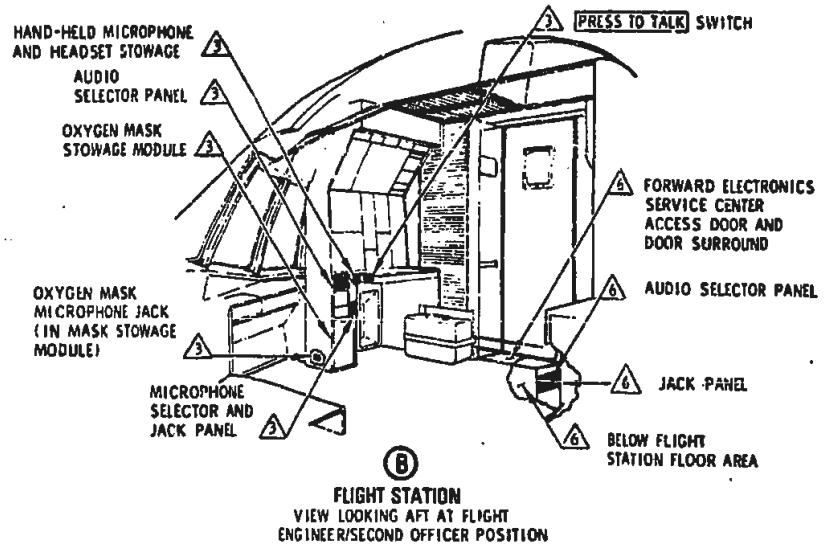
Hard-wired oxygen mask microphone jacks and extension cords are also stored in the modules.

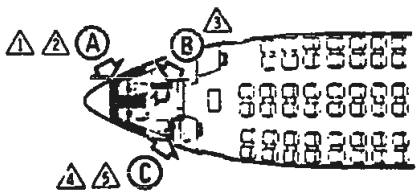
I. Headset/Boom Microphones

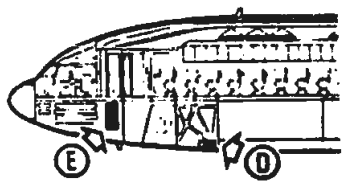
C Provisions. Since TWA does not use the boom microphone,
C these provisions will not be maintained. The special
C pre-amplifier, Plantronics T50-1 will not be removed.
C Neither will it be tested or replaced in any of the three
C installed positions.

J. Headsets


PUSH-TO-TALK SWITCH (ON CONTROL WHEEL)
FLIGHT STATION INTERPHONE SPEAKER
HAND-HELD MICROPHONE STOWAGE
HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLE
OXYGEN MASK MICROPHONE JACK (IN MASK STOWAGE MODULE)
AUDIO SELECTOR PANEL
PUSH-TO-TALK SWITCH (ON CONTROL WHEEL)
FLIGHT STATION INTERPHONE SPEAKER
HAND-HELD MICROPHONE STOWAGE
HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLE
OXYGEN MASK MICROPHONE JACK (IN MASK STOWAGE MODULE)
AUDIO SELECTOR PANEL
A
FLIGHT STATION
VIEW LOOKING FORWARD AT CAPTAIN AND FIRST OFFICER POSITIONS

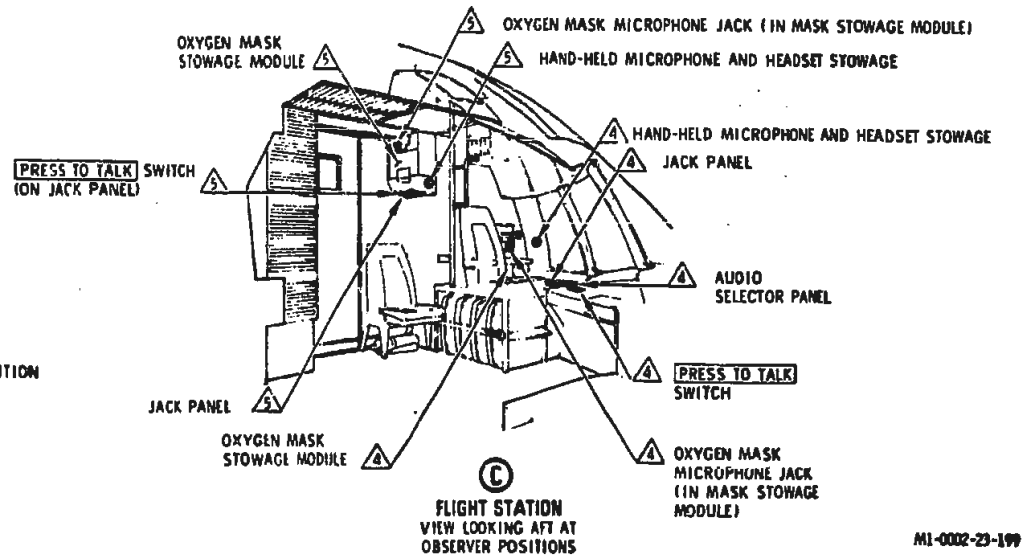

HAND-HELD MICROPHONE AND HEADSET STOWAGE
AUDIO SELECTOR PANEL
OXYGEN MASK STOWAGE MODULE
OXYGEN MASK MICROPHONE JACK (IN MASK STOWAGE MODULE)
MICROPHONE SELECTOR AND JACK PANEL
PRESS TO TALK SWITCH
FORWARD ELECTRONICS SERVICE CENTER ACCESS DOOR AND DOOR SURROUND
AUDIO SELECTOR PANEL
JACK PANEL
BELOW FLIGHT STATION FLOOR AREA
B
FLIGHT STATION
VIEW LOOKING AFT AT FLIGHT ENGINEER/SECOND OFFICER POSITION





NOTE

1. CAPTAINS POSITION
2. FIRST OFFICERS POSITION
3. FLIGHT ENGINEER/SECOND OFFICERS POSITION
4. FIRST OBSERVERS POSITION
5. SECOND OBSERVERS POSITION
6. FORWARD ELECTRONICS SERVICE CENTER

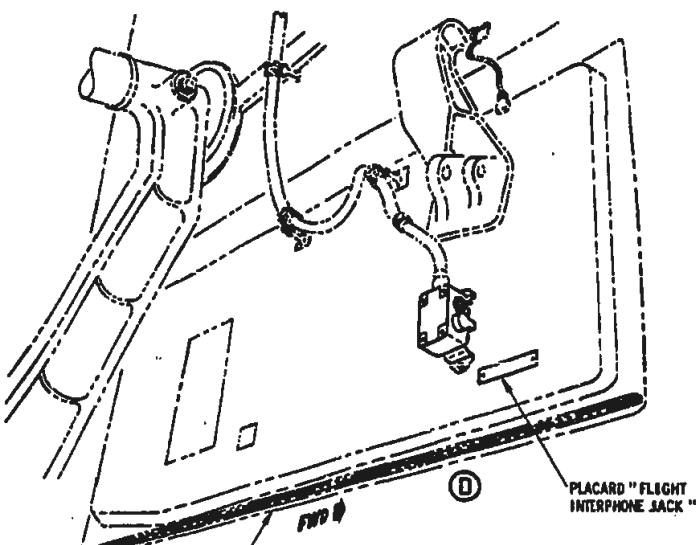

OXYGEN MASK MICROPHONE JACK (IN MASK STOWAGE MODULE)
OXYGEN MASK STOWAGE MODULE
HAND-HELD MICROPHONE AND HEADSET STOWAGE
HAND-HELD MICROPHONE AND HEADSET STOWAGE
PRESS TO TALK SWITCH (ON JACK PANEL)
JACK PANEL
AUDIO SELECTOR PANEL
PRESS TO TALK SWITCH
JACK PANEL
OXYGEN MASK STOWAGE MODULE
OXYGEN MASK MICROPHONE JACK (IN MASK STOWAGE MODULE)
C
FLIGHT STATION
VIEW LOOKING AFT AT OBSERVER POSITIONS

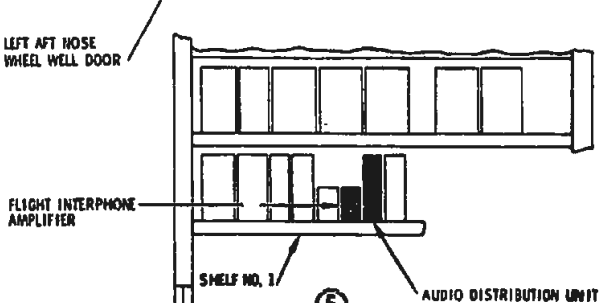
M1-0002-23-199

R Audio Integrating System Equipment and Location
R Figure 1 (Sheet 1)

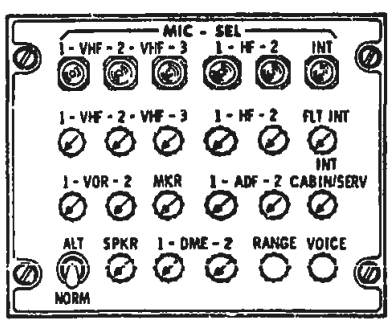
EFFECTIVITY: ALL

001E

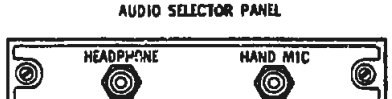




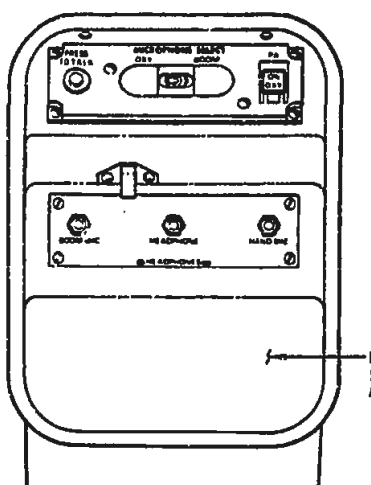
FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING FORWARD



AUDIO SELECTOR PANEL



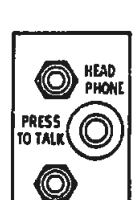
JACK PANEL - FORWARD ELECTRONIC SERVICE CENTER (BELOW AUDIO SELECTOR PANEL)



CAPTAINS HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLE ASSEMBLY - FIRST OFFICERS REVERSED LEFT-TO-RIGHT

MICROPHONE SELECTOR AND JACK PANEL FLIGHT ENGINEER/SECOND OFFICER

JACK PANEL-FIRST OBSERVER



JACK PANEL-SECOND OBSERVER

PRESS TO TALK PANEL - FLIGHT ENGINEER/SECOND OFFICER AND FIRST OBSERVER

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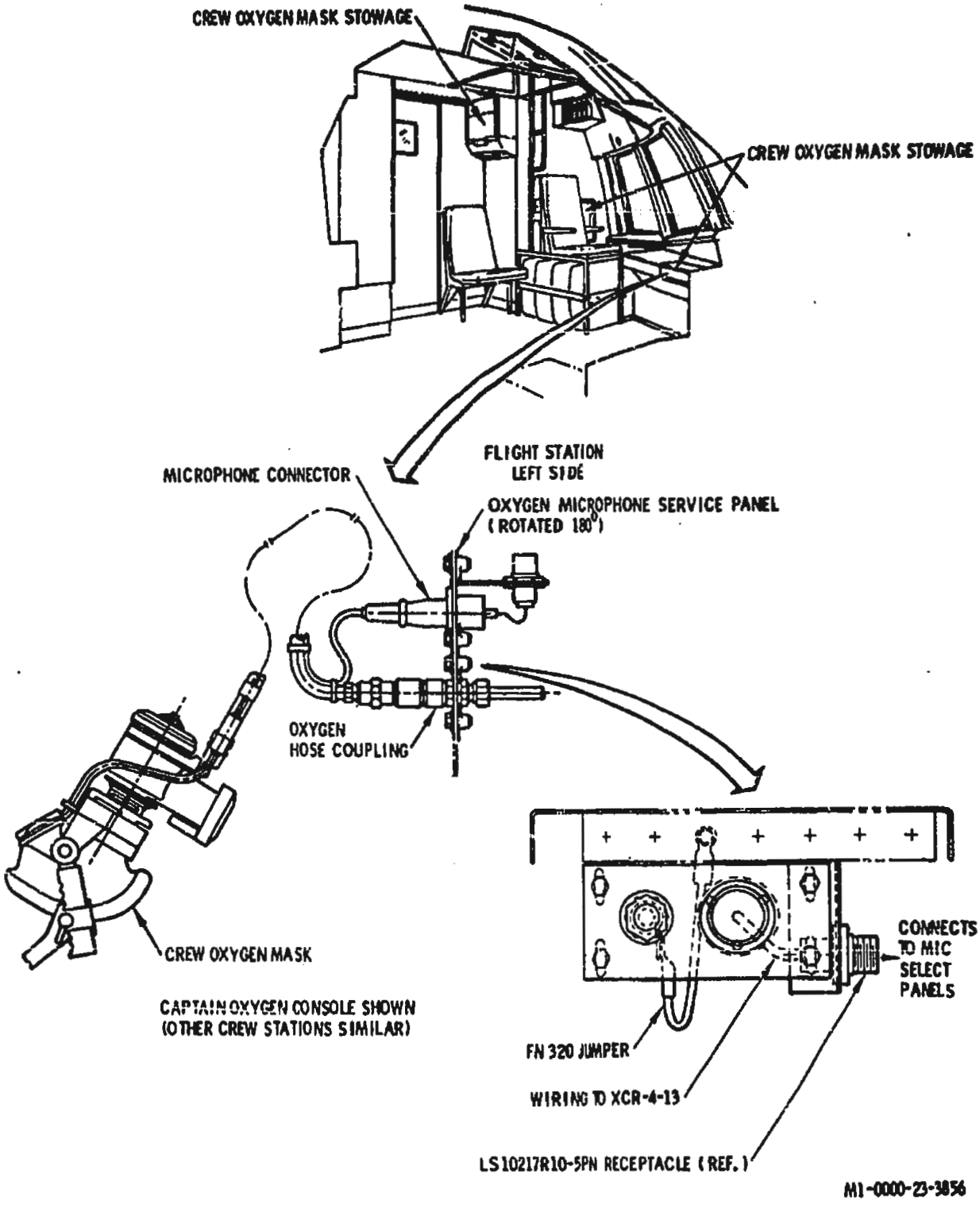
R
R
Audio Integrating System Equipment and Location
Figure 1 (Sheet 2)

EFFECTIVITY: ALL

001B



R Audio Integrating System Equipment and Location
R Figure 1 (Sheet 3)

EFFECTIVITY: ALL

Five headsets, stored as follows:

One in each headset stowage and microphone selector console assembly

One each adjacent to the FE/SO, First Observer, and Second Observer positions

K. Flight Station Speakers

Two flight station speakers in the forward part of the Captains and First Officers side consoles, outboard of the rudder pedals, zones 211 and 212, respectively.

L. Press-To-Talk Switches

Seven press-to-talk (PTT) switches, located as follows:

One each on the outer horns of the Captains and First Officers control wheels

One each on the Captains and First Officers headset stowage and microphone selector console assemblies

One on the forward edge of the FE/SO table

One on the Captains side console to the left of the First Observers position

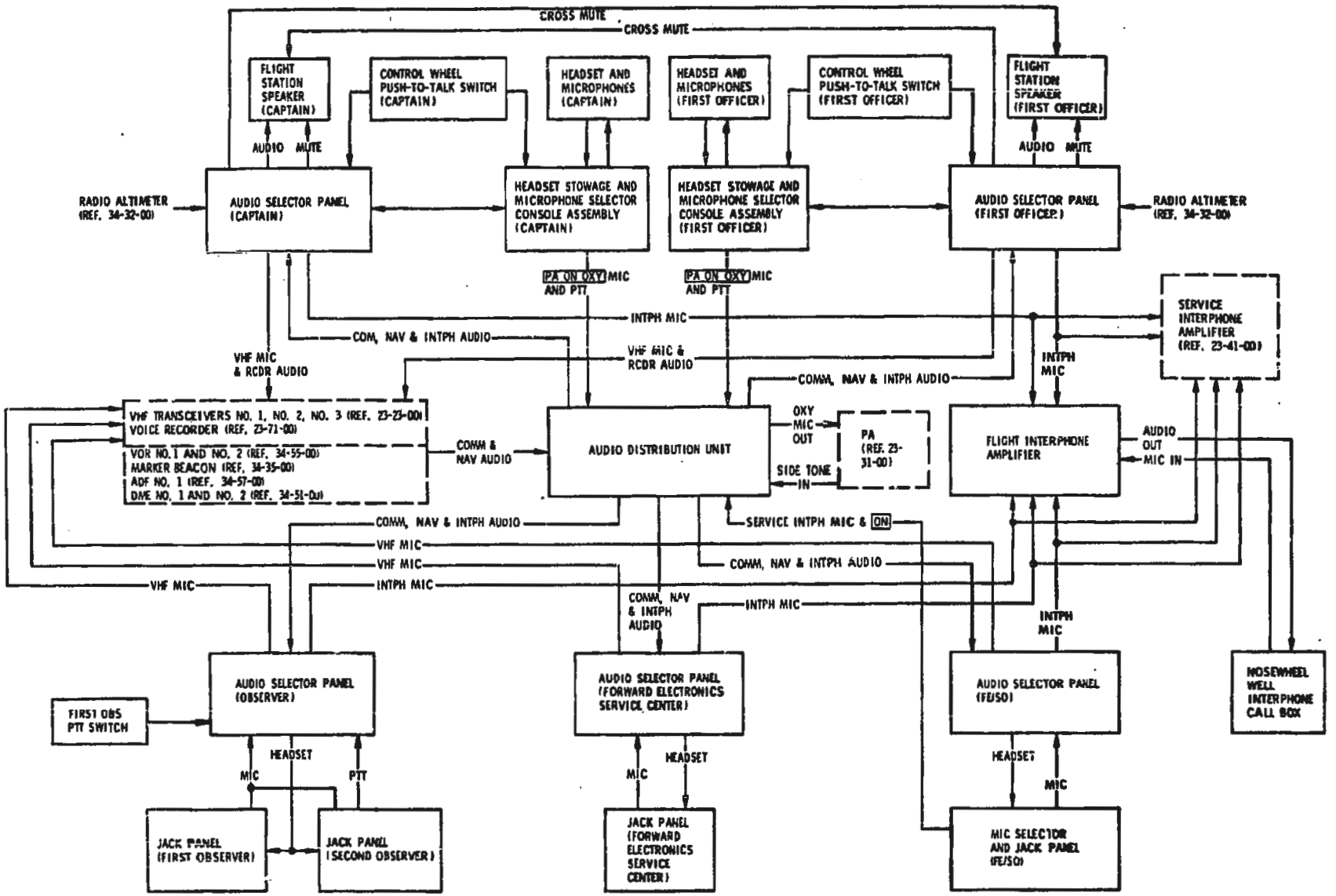
One on the Second Observers jack panel

2. Operation

The system provides interconnections (Ref. Table 1), impedance matching, and audio amplification and gain control, so that each flight station crewmember can communicate over or monitor interphone systems, communication systems, and navigation systems (Ref. Fig. 2). The same capability is provided in the forward electronics service center as a convenience for maintenance. A nosewheel well jack is provided for communications between the flight and ground crews over the flight interphone system.

System power from the aircraft dc buses is filtered in the audio distribution unit and distributed to the other units as follows:

A. Essential Communications Bus - Pilots Overhead Circuit Breaker Panel CB1



R R Audio Integrating System Block Diagram
Figure 2

EFFECTIVITY: ALL

0018

When power is available on the dc Essential Communications bus, the following circuit breakers connect power to the indicated components through the audio distribution unit:

(1) AUDIO CONTROL CAPT & F/E (A12) - Captains and FE/SO audio selector panels, and Captains headset stowage and microphone selector console

(2) AUDIO CONT F/O & OBS (A13) - First Officers and Observers audio selector panels, and First Officers headset stowage and microphone selector console

(3) FLIGHT INTPH AMPL (A14) - flight interphone amplifier

B. Ground Service Bus - FE/SO Aft Circuit Breaker Panel CB3

When power is available on the dc Ground Service bus, the following circuit breakers connect power to the indicated components through the audio distribution unit:

(1) AUDIO CONT CAPT & F/E (C16) - Captains and FE/SO audio selector panels, and Captains headset stowage and microphone selector console.

(2) AUDIO CONT - F/O & OBS (C17) - First Officers and Observers audio selector panels and First Officers headset stowage and microphone selector console.

(3) FLT INTPH AMPL (C18) - flight interphone amplifier

NOTE: Power distribution is through blocking diode circuits in the audio distribution unit. System components can receive power from essential communications bus and ground service bus simultaneously.

Audio Integrating System Interface Functions
Table 1

SYSTEM AND REFERENCE	AUDIO INTEGRATING SYSTEM INTERFACE FUNCTION
VHF Communication 23-23-00	Connects headset and hand-held, headset/boom, or oxygen mask microphone to VHF-1, VHF-2, or VHF-3, as selected. Completes headset audio and microphone voice and PTT circuits to the selected transceiver. Controls receiver audio and transmitter sidetone levels to headsets. Mutes both flight station speakers when transmitting from Captains or First Officers position.
HF Communication	Provisions only
Interphone 23-41-00 23-43-00	Connects headsets and hand-held, headset/boom, or oxygen mask microphones to flight interphone, and/or cabin/galley interphone and service interphone, as selected. Flight interphone (FLT INT) is part of audio integrating system, and interconnects five flight station crewmember positions, forward electronics service center, and nosewheel well interphone call box. Cabin/galley and service interphone (INT CABIN/SERV) interface connects flight station crewmember positions with passenger cabin, galley, and service interphone positions throughout the aircraft. Completes headset audio and microphone voice and PTT circuits between selected positions. Controls audio level of selected headset circuits. Mutes flight station speakers when PTT is pressed at Captains or First Officers position.
Passenger Address (PA) and Audio Entertainment 23-31-00 23-33-00	Connects Captains or First Officers hand held, headset/boom, or oxygen mask microphones to passenger address and audio entertainment systems. Controls priority for use of PA system. Overrides audio entertainment on all channels when PA is keyed. Audio can be monitored over flight station PA speaker.

Audio Integrating System Interface Functions (Cont)
Table 1

SYSTEM AND REFERENCE	AUDIO INTEGRATING SYSTEM INTERFACE FUNCTION
ADF 34-57-00	Connects ADF-1 and/or ADF-2 audio input to headsets, when selected, and controls audio level. ADF-2 is provisions only. If VOICE or RANGE is selected, range/voice filter is connected to block unwanted signals. If both VOICE and RANGE are selected, or if neither is selected, filter is not connected.
VOR 34-55-00	Connects VOR-1 and/or VOR-2 audio input to headsets, and controls audio level. If VOICE or RANGE is selected, range/voice filter is connected to block unwanted signals. If both VOICE and RANGE are selected, or if neither is selected, filter is not connected.
Marker Beacon 34-35-00	Connects marker beacon audio input to headsets, and controls audio level.
Distance Measuring Equipment (DME) 34-51-00	Connects DME-1 and/or DME-2 audio input to headsets, and controls audio level.
Radio Altimeter 34-32-00	Radio Altimeter No. 1 decision height (DH) warning audio is connected to the Captains headset at all times. Radio Altimeter No. 2 DH audio is connected to the First Officers headset at all times.
Voice Recorder 23-71-00	All microphone and audio signals selected at and processed by the audio selector panels at the Captains, First Officers, and FE/SO positions are connected to the voice recorder.

All flight station crewmember headset audio circuits, and microphone voice and PTT circuits, are connected from their respective consoles/jacks/panels to the corresponding audio selector panel. For example, the Captains headset, hand-held microphone, headset/boom microphone, and oxygen mask microphone are connected from the Captains headset stowage and microphone selector console to the Captains audio selector panel.

All system VHF microphone outputs, including PTT circuits, are connected directly from the audio selector panels to the selected transceiver.

When MIC SEL INT and FLT INT are selected, the microphone voice circuit is connected to the flight interphone amplifier input circuits. The flight interphone inputs are then amplified, impedance-matched in the audio distribution unit, and distributed to the five audio selector panels.

The nosewheel well interphone call box microphone voice and headset audio circuits are connected directly to the flight interphone amplifier input/output circuits.

If the PA ON OXY switchlight on the Captains or First Officers headset stowage and microphone selector console is depressed, the oxygen mask microphone voice circuits and the microphone selector console PRESS TO TALK circuits are connected through the audio distribution unit to the PA system, without being routed through the audio selector panels.

Except for the radio altimeter DH warning audio, all inputs to the audio integrating system, including flight interphone audio from the interphone amplifier, are connected through the audio distribution unit, to each of the five audio selector panels in parallel. Individual signals (VHF, ADF, etc.) are connected to the corresponding selector switches on the audio selector panels (VHF transceiver No. 1 to each of the five VHF-1 selector switches, etc.), with the exception of the radio altimeter DH warning signal audio, which is connected directly to the audio input summing circuits in the Captains and First Officers audio selector panels.

All audio signals selected at the Captains, First Officers, and FE/SO audio selector panels are connected directly from the panels to the voice recorder.

3. Control

A. Flight Interphone

To establish voice communications between flight station crewmember positions, forward electronic service center position, and/or nosewheel well interphone call box, the following switch selections must be made:

(1) On audio selector panel(s), depress MIC SEL INT and FLT INT switches. Turn FLT INT switch(es) clockwise to increase audio level.

NOTE: Nosewheel well interphone call box is always connected to flight interphone.

(2) For Captains, First Officers, or FE/SO positions, select OXY or BOOM on corresponding microphone selector panel(s).

(3) Press hand-held microphone PTT switch; control wheel PTT switch; or FE/SO, First Observer, or Second Observer PTT switch. Oxygen mask microphone, headset/boom microphone, or hand-held microphone can be used, as applicable.

B. VHF Communication

To connect any flight station crewmember position with VHF No. 1, VHF No. 2, or VHF No. 3, the following switch selections must be made (Ref. 23-23-00 for VHF system operation):

(1) On audio selector panel(s), depress MIC SEL VHF-1, VHF-2, or VHF-3. Depress corresponding VHF-1, VHF-2, or VHF-3 audio input switch. Turn switch clockwise to increase audio level.

(2) For Captains, First Officers, or FE/SO positions, select OXY or BOOM on microphone selector panel.

(3) Press hand-held microphone PTT switch; control wheel PTT switch; or FE/SO, First Observer, or Second Observer PTT switch, as applicable. Oxygen mask, hand-held, or headset/boom microphone can be used, as applicable.

C. HF Communication

Provisions only

D. Navigation Audio

To listen to VOR-1, VOR-2, marker beacon, ADF-1, DME-1, or DME-2 audio signals at any flight station crewmember position or the forward electronic service center position, the following switch selections must be made (Ref. 34-55-00, 34-35-00, 34-57-00, or 34-51-00, respectively, for VOR, MRKR, ADF, or DME):

(1) On audio selector panel(s), depress switch(es) for the desired audio signals.

(2) Turn switch clockwise to increase audio level.

(3) If RANGE or VOICE is selected (VOR and ADF only) the voice/range filter is connected to block unwanted signals.

E. Cabin/Galley or Service Interphone

To establish voice communications between flight station crew member positions and/or the forward electronic service center position, and any of the stations of the cabin (not galley) interphone system or the service interphone system, the following switch selections must be made (Ref. 23-41-00 for cabin/galley interphone system operation; Ref. 23-43-00 for service interphone system operation):

(1) On audio selector panel(s), depress MIC SEL - INT and INT CABIN/SERV switches. Turn INT CABIN/SERV clockwise to increase audio level.

(2) For Captains, First Officers, or FE/SO positions, select OXY or BOOM on headset stowage microphone selector console.

(3) Press hand-held microphone PTT switch; control wheel PTT switch; or FE/SO, First Observer, or Second Observer PTT switch, as applicable. Oxygen mask, hand-held, or headset/boom microphone can be used. Smoke mask, oxygen mask, or headset/boom microphone can be used, as applicable.

F. Passenger Address and Audio Entertainment

To make announcements over the PA and audio entertainment systems, using the Captains or First Officers oxygen mask microphones only, the following switch selections must be made (Ref. 23-31-00 for PA system operation; Ref. 23-33-00 for passenger audio entertainment operation):

(1) On the Captains or First Officers headset stowage and microphone selector console, depress PA ON OXY.

(2) Depress headset stowage and microphone selector console PRESS TO TALK switch.

G. Radio Altimeter

To listen to the radio altimeter DH audio warning signal at the Captains or First Officers position, no switch selection is required (radio altimeter is connected directly to the audio selector panel input summing circuit - Ref. Table 1).

H. Flight Station Speakers

To connect all audio input signals from the Captains or First Officers audio selector panels to the corresponding flight station speaker, depress the SPKR switch on the

appropriate audio selector panel, and turn the switch clockwise to increase the audio level.

I. ALT/NORM

The ALT/NORM switch on each audio selector panel switches all audio input signals to the A-1 (NORM) or A-2 (ALT) isolation amplifiers in the panel.

4. Audio Distribution Unit

A. Description and Operation

The audio distribution unit (Ref. Fig. 3) provides a junction for the integration of interphone, PA, communication, and navigation audio signals. Impedance matching networks, relay switching circuits, and dc power filters are included in the unit. No amplification of audio signals takes place in this unit.

All flight interphone input signals are processed by the audio distribution unit. The unit includes resistors to match the output impedance of the flight interphone amplifier; the unit distributes the audio to the five audio selector panels. The unit also includes filters for aircraft 28V dc input power.

On aircraft 001-031, the audio distribution unit contains relays which connect the service interphone jacks to the service interphone amplifier when the service interphone is turned on; the relays ground the jacks when the system is off (Ref. 23-43-00).

The audio distribution unit contains resistors which match the impedance of audio inputs from the service interphone system amplifier; the unit distributes the service interphone audio to the five audio selector panels (Ref. 23-43-00).

The audio distribution unit contains relay switching logic circuits which control the priority of PA system announcements (Ref. 23-31-00). The unit also contains PA switching relays for the selection of first class/coach sections (including VU meter selection), connection of the PA flight station speaker, selection of the PA ground or airborne mode, and relays to control the PA IN USE lights.

The audio distribution unit contains resistors to match the communication and navigation receiver audio outputs; the

receiver audio signals are distributed to the five audio selector panels.

5. Audio Selector Panel

A. Description

The audio selector panels (Ref. Fig. 4) contain pushbutton microphone switches, audio selector/volume controls, an amplifier selector switch, and voice/range filter selector switches (Ref. Fig. 4). The audio selector/volume controls are combination pushbutton on-off switches with rotary volume controls.

The following microphone (MIC SEL) switches are provided:

VHF-1
VHF-2
VHF-3
HF-1
HF-2
INT

The microphone selector switches are interlocked to prevent dual operation and cross-talk.

The following audio selector/volume controls are provided:

VHF-1
VHF-2
VHF-3
HF-1
HF-2
FLT INT
VOR-1
VOR-2
MKR
ADF-1
ADF-2
INT CABIN/SERV
SPKR
DME-1
DME-2

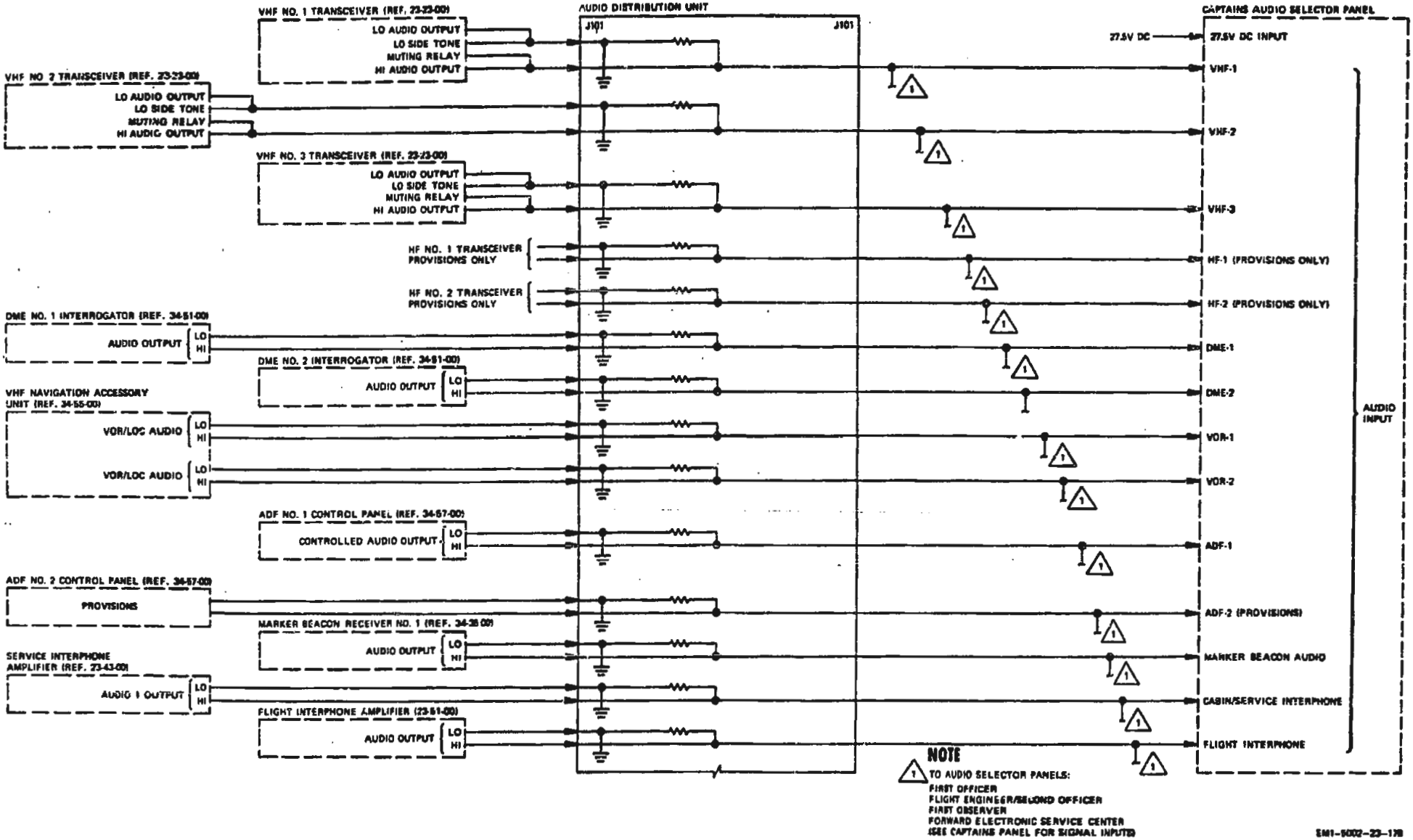
Two pushbutton filter switches are provided; they are the RANGE and VOICE switches. An isolation amplifier ALT-NORM toggle switch connects all audio signals to either isolation amplifier No. 1 or No. 2.

B. Operation

Power for the audio selector panels (28V dc) is supplied by the audio distribution unit.

The audio selector panel transmitting (microphone) and receiving (audio) circuits function independently.

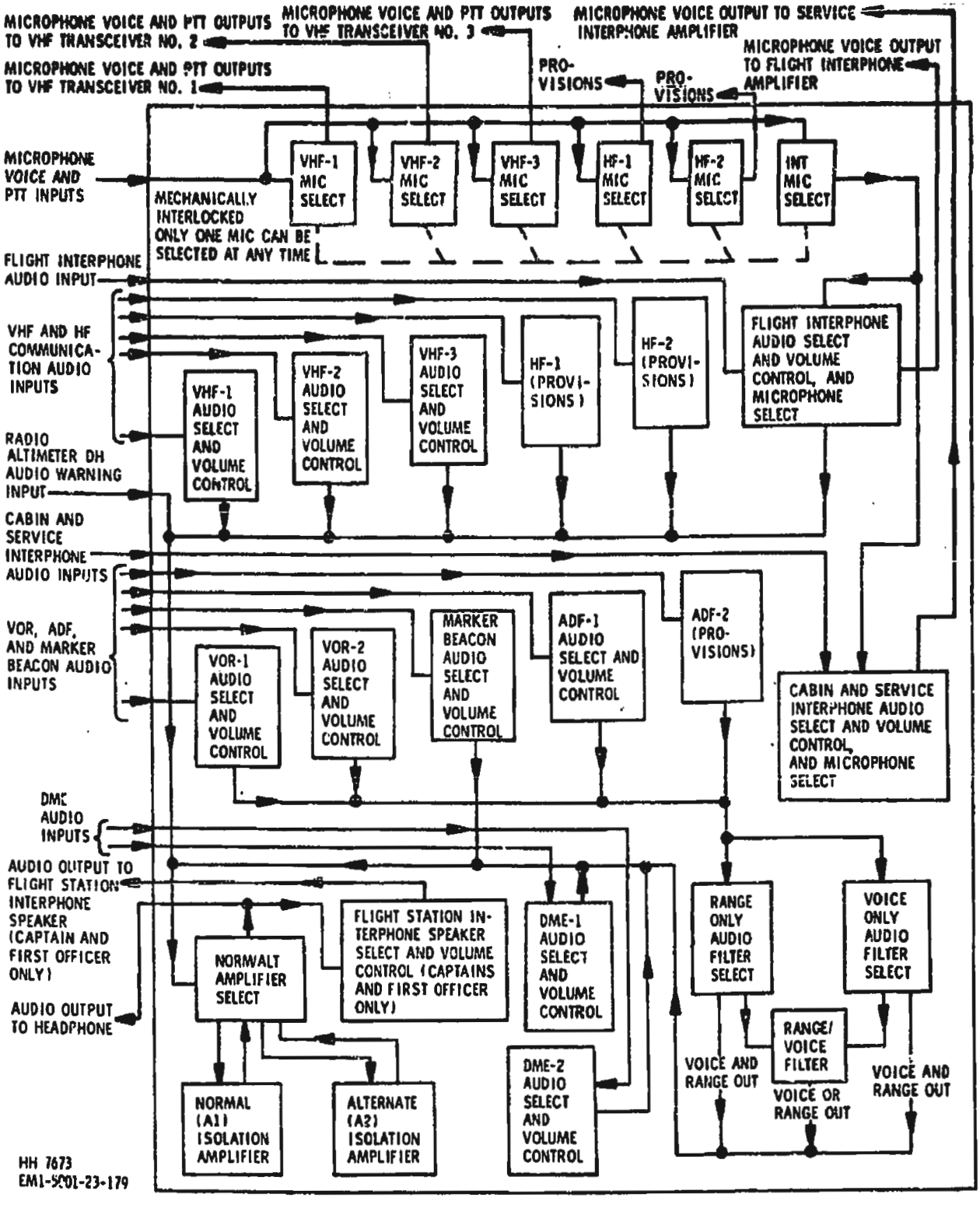
The mechanically interlocked microphone switches serve only to connect the microphone voice and PTT circuits to the selected transceiver (VHF), or to the interphone amplifier



R Audio Distribution Unit Block Diagram
R Figure 3

EFFECTIVITY: ALL

001B


MICROPHONE VOICE AND PTT OUTPUTS TO VHF TRANSCEIVER NO. 2
MICROPHONE VOICE AND PTT OUTPUTS TO VHF TRANSCEIVER NO. 3
MICROPHONE VOICE OUTPUT TO SERVICE INTERPHONE AMPLIFIER
MICROPHONE VOICE AND PTT OUTPUTS TO VHF TRANSCEIVER NO. 1
PRO-VISIONS
PRO-VISIONS
MICROPHONE VOICE OUTPUT TO FLIGHT INTERPHONE AMPLIFIER
MICROPHONE VOICE AND PTT INPUTS
VHF-1 MIC SELECT
VHF-2 MIC SELECT
VHF-3 MIC SELECT
HF-1 MIC SELECT
HF-2 MIC SELECT
INT MIC SELECT
MECHANICALLY INTERLOCKED ONLY ONE MIC CAN BE SELECTED AT ANY TIME
FLIGHT INTERPHONE AUDIO INPUT
VHF AND HF COMMUNICATION AUDIO INPUTS
VHF-1 AUDIO SELECT AND VOLUME CONTROL
VHF-2 AUDIO SELECT AND VOLUME CONTROL
VHF-3 AUDIO SELECT AND VOLUME CONTROL
HF-1 (PROVISIONS)
HF-2 (PROVISIONS)
FLIGHT INTERPHONE AUDIO SELECT AND VOLUME CONTROL, AND MICROPHONE SELECT
RADIO ALTIMETER DH AUDIO WARNING INPUT
CABIN AND SERVICE INTERPHONE AUDIO INPUTS
VOR, ADF, AND MARKER BEACON AUDIO INPUTS
VOR-1 AUDIO SELECT AND VOLUME CONTROL
VOR-2 AUDIO SELECT AND VOLUME CONTROL
MARKER BEACON AUDIO SELECT AND VOLUME CONTROL
ADF-1 AUDIO SELECT AND VOLUME CONTROL
ADF-2 (PROVISIONS)
CABIN AND SERVICE INTERPHONE AUDIO SELECT AND VOLUME CONTROL, AND MICROPHONE SELECT
DME AUDIO INPUTS
AUDIO OUTPUT TO FLIGHT STATION INTERPHONE SPEAKER (CAPTAIN AND FIRST OFFICER ONLY)
AUDIO OUTPUT TO HEADPHONE
NORMWALT AMPLIFIER SELECT
FLIGHT STATION INTERPHONE SPEAKER SELECT AND VOLUME CONTROL (CAPTAINS AND FIRST OFFICER ONLY)
DME-1 AUDIO SELECT AND VOLUME CONTROL
RANGE ONLY AUDIO FILTER SELECT
VOICE ONLY AUDIO FILTER SELECT
RANGE/VOICE FILTER
VOICE AND RANGE OUT
VOICE OR RANGE OUT
VOICE AND RANGE OUT
NORMAL (A1) ISOLATION AMPLIFIER
ALTERNATE (A2) ISOLATION AMPLIFIER
DME-2 AUDIO SELECT AND VOLUME CONTROL
HH 7673
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R
R

Audio Selector Panel Block Diagram
Figure 4

(INT). No impedance matching or amplification of microphone voice signals takes place in the audio selector panels.

The audio input selector/volume controls allow selection and individual input level control of any combination of interphone, radio communication, and navigation audio signals. Each selector/volume control is a combination pushbutton switch and potentiometer level control. When an audio input is selected, it is connected to the input of either isolation amplifier A1 (NORM) or isolation amplifier A2 (ALT). All selected audio inputs are paralleled to the isolation amplifier input. The isolation amplifiers have an amplification factor of 1:1; they provide isolation between their inputs and outputs, and match the audio output impedance to the headsets. The voice recorder output is in parallel with the headset output.

If the SPKR control on the Captains and/or First Officers panel is depressed, all selected audio input signals are connected to the corresponding flight station speaker(s) from the isolation amplifier output (in parallel with the headset and voice recorder outputs).

Both speakers are muted if either one of the Captains or First Officers hand-held microphone or control wheel PTT switches, or either one of the headset stowage and microphone selector console PRESS TO TALK switches is depressed.

If either the RANGE or VOICE switch is depressed, the voice/range filter is connected in series between the VOR/ADF inputs and the isolation amplifier. The filter blocks unwanted signals, either voice or range, as selected. If both VOICE and RANGE are selected, or if neither is selected, the filter is disconnected.

6. Headset Stowage and Microphone Selector Console Assembly

A. Description and Operation

The headset stowage and microphone selector console assemblies provide connections from the Captains and First Officers headsets and microphones to the respective audio selector panels, and oxygen mask microphone voice and PTT circuits through the audio distribution unit to the PA system (Ref. 23-31-00).

Jacks are provided on each console to connect a headset (HEADPHONE), a hand-held microphone (HAND MIC), and a headset/boom microphone (BOOM MIC) to the corresponding audio selector panel. Oxygen mask microphone jacks, stored

in the Captains and First Officers oxygen mask stowage modules, are hard-wired to the consoles. The OXY/BOOM toggle switch on each console provides for connection of either the oxygen mask microphone or the boom microphone jack to the audio selector panel. The PTT switch on the corresponding control wheel is used to key the oxygen mask microphone for all functions except oxygen mask on PA.

A PA ON OXY switchlight on each headset stowage and microphone selector console connects the oxygen mask microphone to the PA system. When the switchlight is depressed, the oxygen mask microphone voice circuits and the console PRESS TO TALK circuit are connected through the audio distribution unit (PA priority switching) to the PA system.

A preamplifier is provided in the console assembly for the headset/boom microphone.

7. Microphone Selector and Jack Panel

A. Description and Operation

The microphone selector and jack panel provides connections from the FE/SO headset and microphones to the corresponding audio selector panel, and microphone voice and PTT circuits to the service interphone system (Ref. 23-43-00). A switchlight on the panel controls connection of the service interphone jacks to the service interphone system.

Jacks are provided on the microphone selector and jack panel to connect a headset (HEADPHONE), a hand-held microphone (HAND MIC), and a headset/boom microphone (BOOM MIC) to the audio selector panel. An oxygen mask microphone jack, stored in the FE/SO oxygen mask stowage module, is hard-wired to the panel. The OXY/BOOM toggle switch provides for connection of either the oxygen mask microphone or the boom microphone jack to the audio selector panel. The PRESS TO TALK switch located on the forward edge of the FE/SO table is used to key the oxygen mask or headset/boom microphone.

A separate SERVICE INTERPHONE jack is provided on the microphone selector and jack panel for use with a service interphone headset (service interphone system). A SERVICE INTERPHONE ON switchlight controls relay circuits in the service interphone system which connect the service interphone jacks when the switchlight is depressed, and grounds the jacks when the switchlight is released.

A voice preamplifier is provided in the microphone selector and jack panel for the headset/boom microphone.

8. Interphone Amplifier

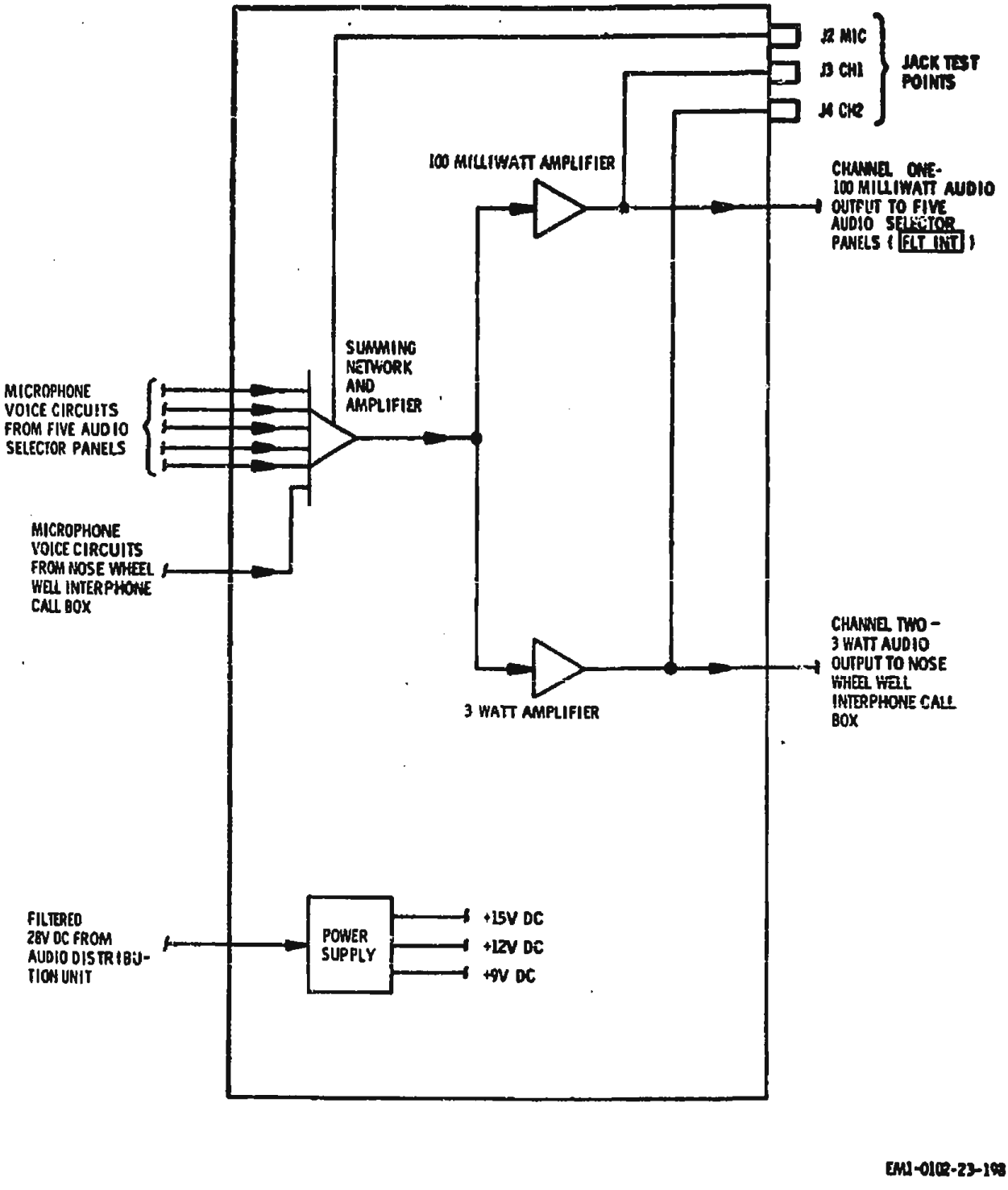
A. Description and Operation

The flight interphone amplifier (Ref. Fig. 5) matches the impedance of audio integrating system microphones, sums the microphone inputs and amplifies them, and supplies the amplified audio to the audio distribution unit and the nosewheel well interphone call box.

The interphone amplifier contains a summing (impedance matching) network, an input amplifier, and two output amplifiers. The output amplifiers are rated at 100 milliwatts power for channel 1 (to the audio distribution unit), and 3 watts power for channel 2 (to the nosewheel well interphone call box jack).

Filtered 28V dc power is supplied to the interphone amplifier from the audio distribution unit. Internal voltages are provided by voltage dropping resistors and zener diodes.

Three jacks on the front of the interphone amplifier provide connections to the amplifier input and output circuits. The J2 MIC jack provides a connection for a 150-ohm carbon microphone and PTT circuit to the input amplifier; the J3 HDST CH 1 jack provides a connection for a 600-ohm headset to the output of the channel 1 (100 milliwatt) amplifier; and the J4 HDST CH 2 jack provides a connection for a 600-ohm headset to the output of the channel 2 (3 watt) amplifier.



Flight Interphone Amplifier Block Diagram
Figure 5

AUDIO INTEGRATING SYSTEM - FAULT ISOLATION

1. General

The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 lists the fault isolation diagrams and schematics in this section.

TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Audio Problems (Radio/Interphone)
104	Push to Talk Problems
105	Defective Flight Station Speaker
106	Unwanted Audio and/or Excessive Hum
107	Audio Problems (Flight Interphone)
SCHEM 1	Audio Integrating System Power Distribution

TABLE 101 (Cont)

FIGURE	TITLE
SCHEM 2	Audio Integrating System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
AMPLIFIER – FLT STA INTERPHONE	1	FESC, REAR RACK/112AB	23-61-12
AMPLIFIER – SERVICE INTERPHONE	1	FESC, REAR RACK/112AB	23-43-01
CIRCUIT BREAKERS:			
AUDIO CONTROL – CAPT & FE (2351-CB3)	1	PILOT OVHD CB1 PNL (A12)	*
AUDIO CONTROL – F/O & OBS (2351-CB1)	1	PILOT OVHD CB1 PNL (A13)	*
AUDIO CONTROL – FLT INTPH AMPL (2351-CB7)	1	PILOT OVHD CB1 PNL (A14)	*
AUDIO CONTROL – CAPT & FE (2351-CB4)	1	FE/SO AFT CB3 PNL (C16)	*
AUDIO CONTROL – F/O & OBS (2351-CB2)	1	FE/SO AFT CB3 PNL (C17)	*
AUDIO CONTROL – FLT INTPH AMPL (2351-CB8)	1	FE/SO AFT CB3 PNL (C18)	*
DISTRIBUTION UNIT – AUDIO	1	FESC, REAR RACK/112AB	23-51-03
PANEL – AUDIO SELECTOR, CAPT/FO	2	FLT STA/P17	23-51-04
PANEL – AUDIO SELECTOR, FE/SO	1	FLT STA/P13	23-51-04
PANEL – AUDIO SELECTOR, FESC	1	FESC/112AB	23-51-04
PANEL – AUDIO SELECTOR, OBS	1	FLT STA, LH SIDE CONSOLE	23-51-04
PANEL – JACK, FESC	1	FESC/112AB	23-51-14
PANEL – JACK, FIRST OBS	1	FLT STA, LH SIDE CONSOLE	23-51-01
PANEL – JACK, MIC SELECTOR, CAPT	1	FLT STA/P14	23-51-09
PANEL – JACK, MIC SELECTOR, FO	1	FLT STA/P15	23-51-09
PANEL – JACK, MIC SELECTOR, FE/SO	1	FLT STA/P13	23-51-10
PANEL – JACK, SECOND OBS	1	FLT STA, SECOND OBS STA	23-51-12
SPEAKERS – COCKPIT	2	FLT STA/P14, P15	23-51-11
SWITCH – PUSH TO TALK – CONTROL WHEEL	2	FLT STA, CAPT & FO	23-00-01
SWITCH – PUSH TO TALK – MASK MIC & HAND MIC – FE/SO & FIRST OBS	2	FLT STA/P13 & LH SIDE CONSOLE	23-51-00

*SEE WM EQUIPMENT LIST

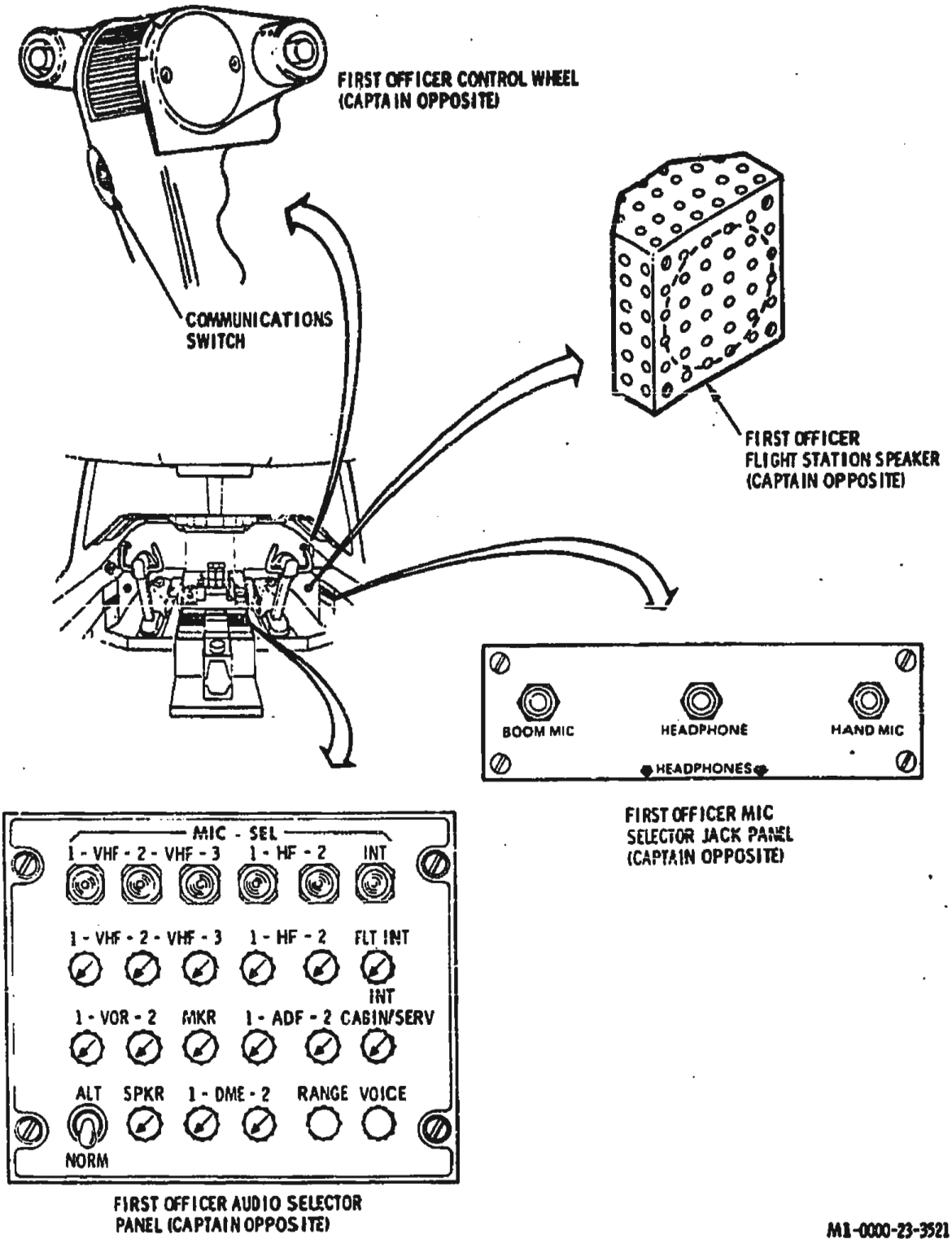
M1-0000-23-4268

R
R

Component Location Index
Figure 101

EFFECTIVITY: ALL

001B

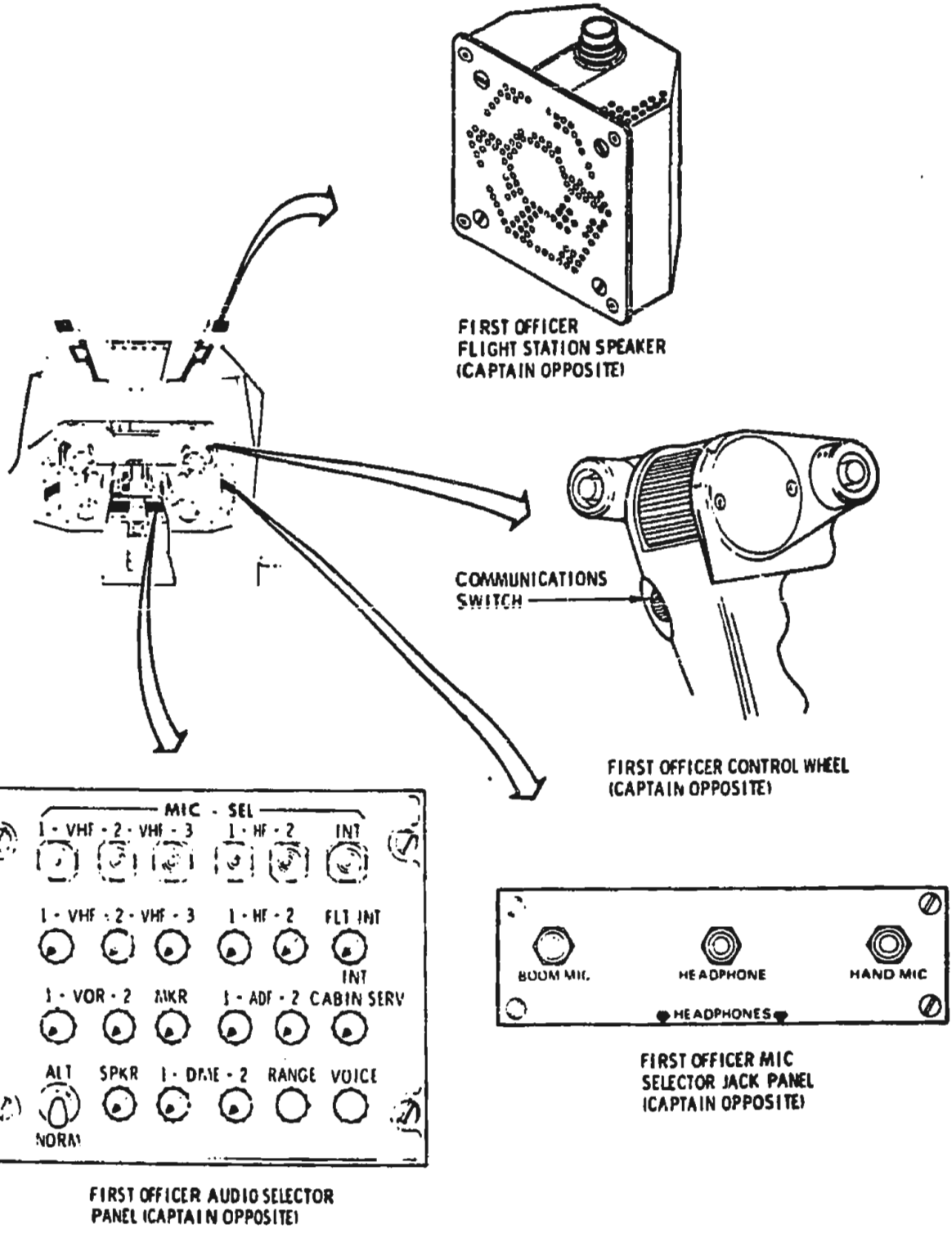


FIRST OFFICER MIC
SELECTOR JACK PANEL
(CAPTAIN OPPOSITE)

FIRST OFFICER AUDIO SELECTOR
PANEL (CAPTAIN OPPOSITE)

M1-0000-23-3521

Component Locator Diagram
Figure 102 (Sheet 1)



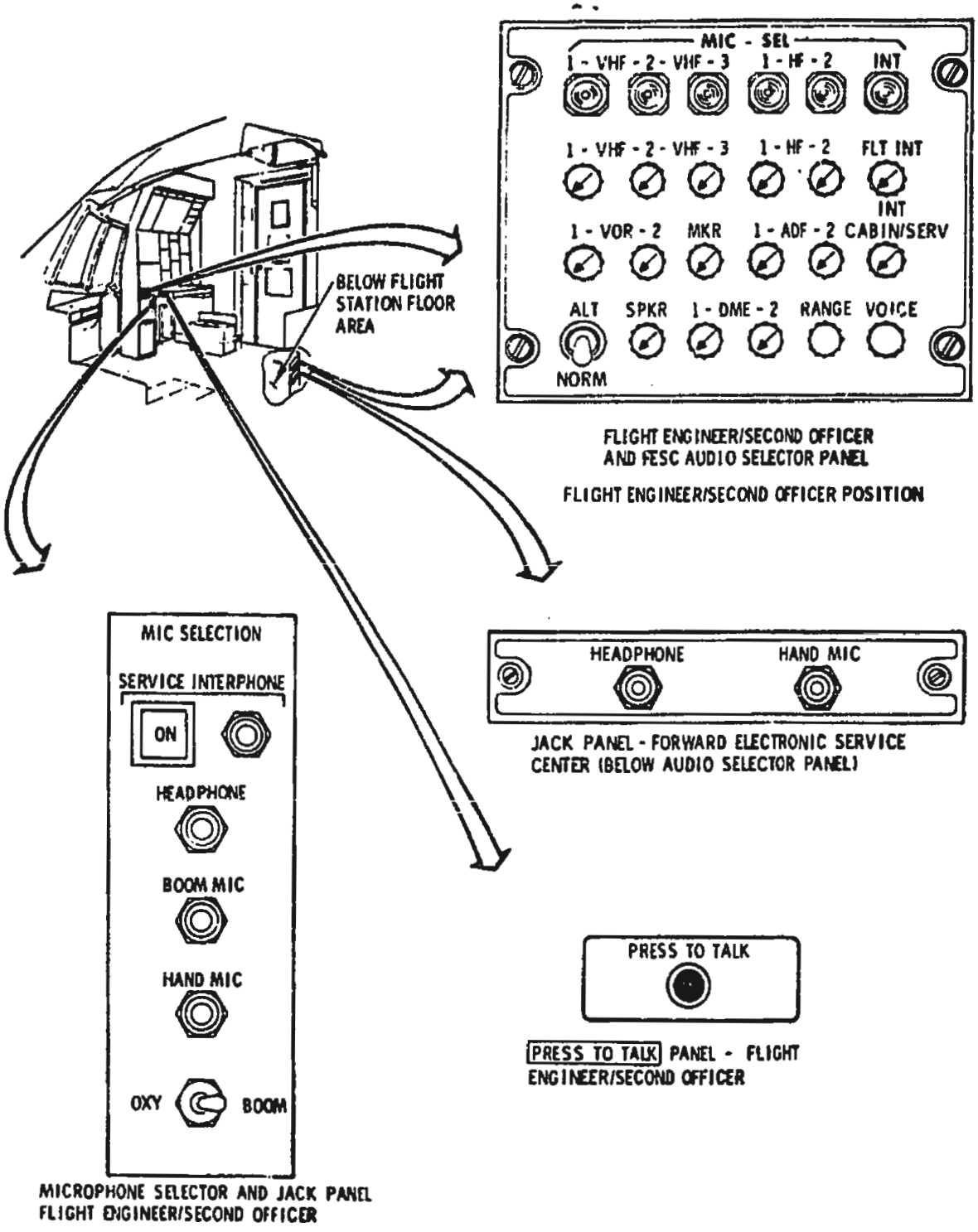
M1-0000-23-3641

R
R

Component Locator Diagram
Figure 102 (Sheet 1)

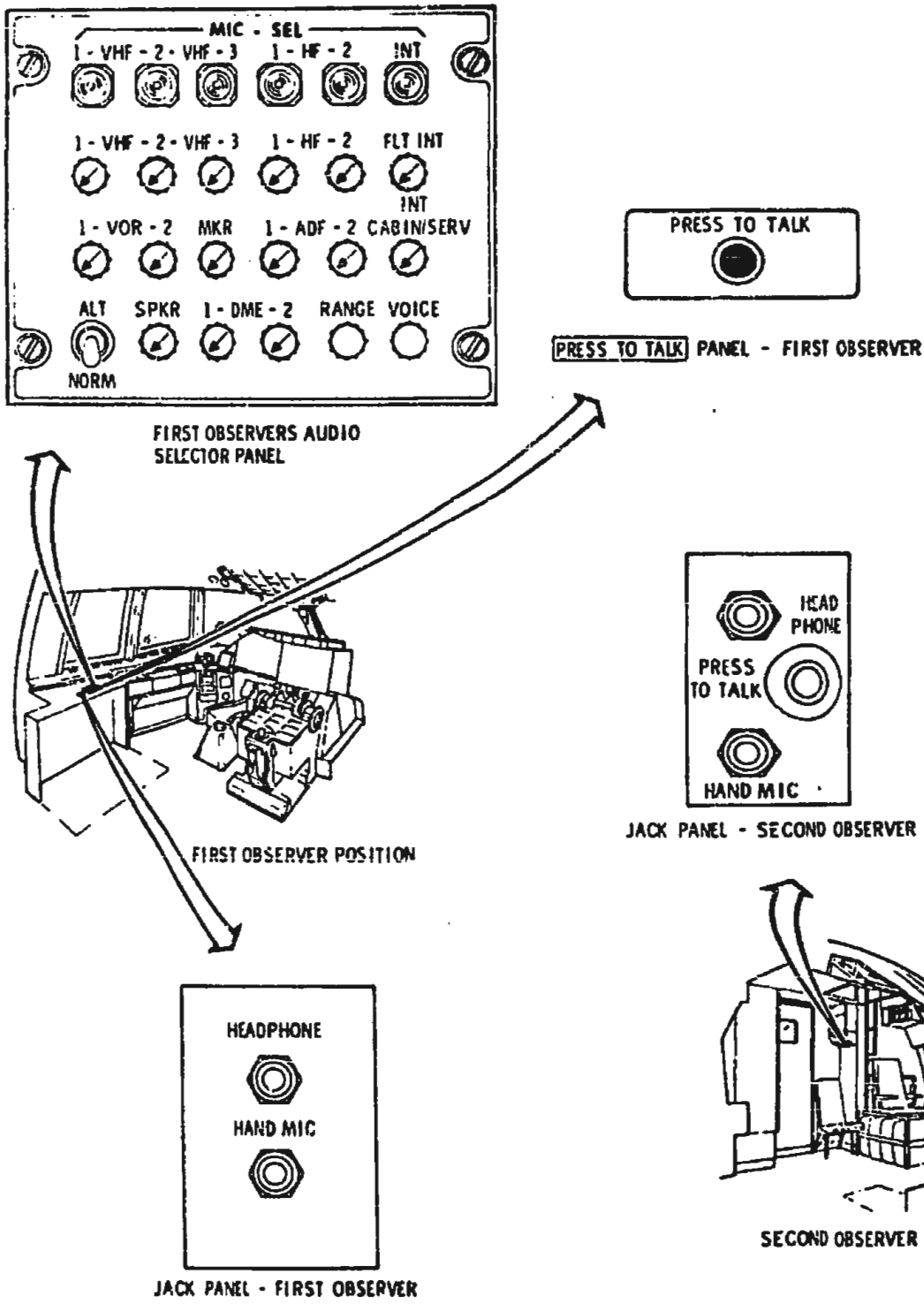
EFFECTIVITY: 032-999

0018

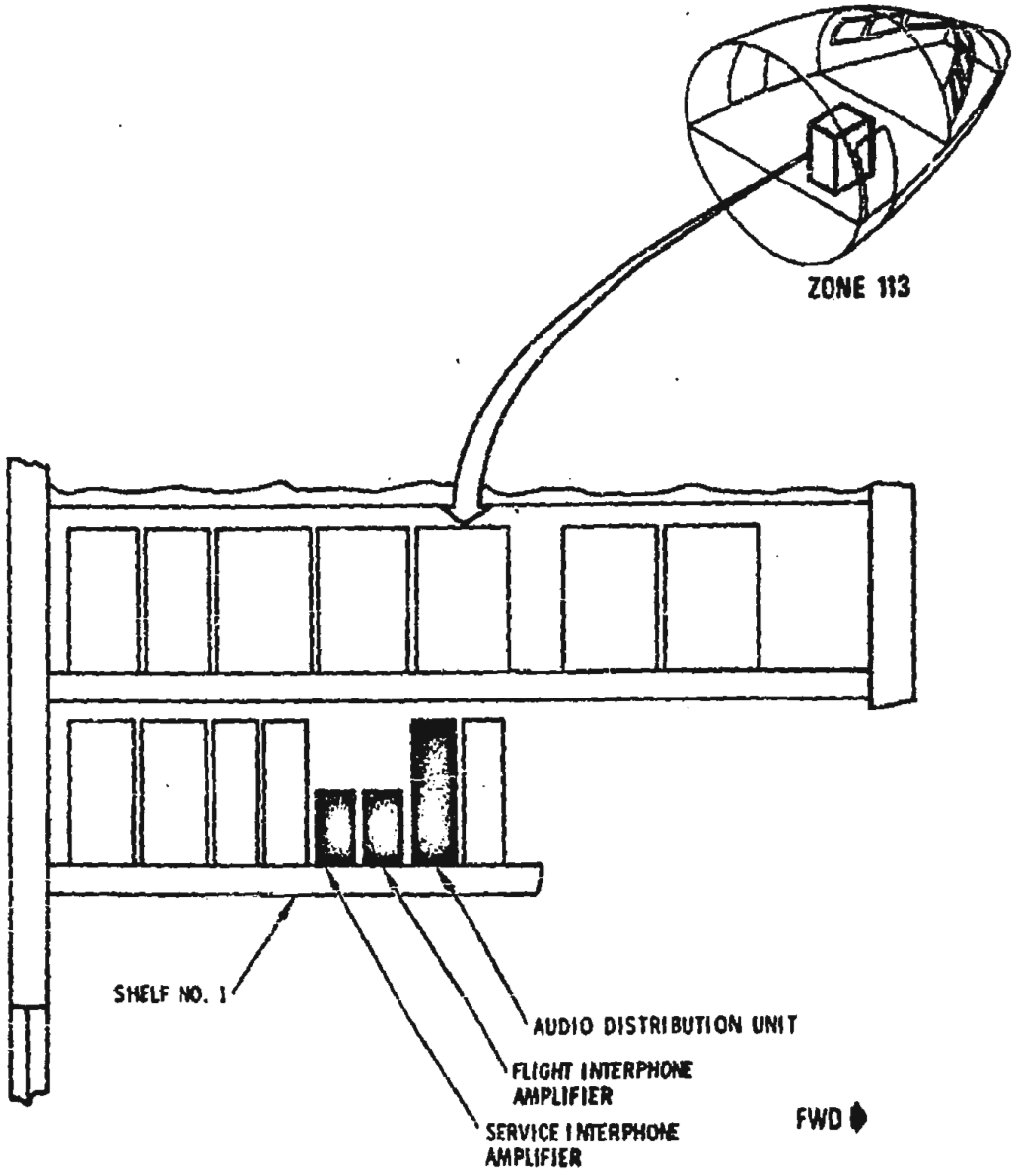


M1-0000-23-3528

Component Locator Diagram
Figure 102 (Sheet 2)



Component Locator Diagram
Figure 102 (Sheet 3)

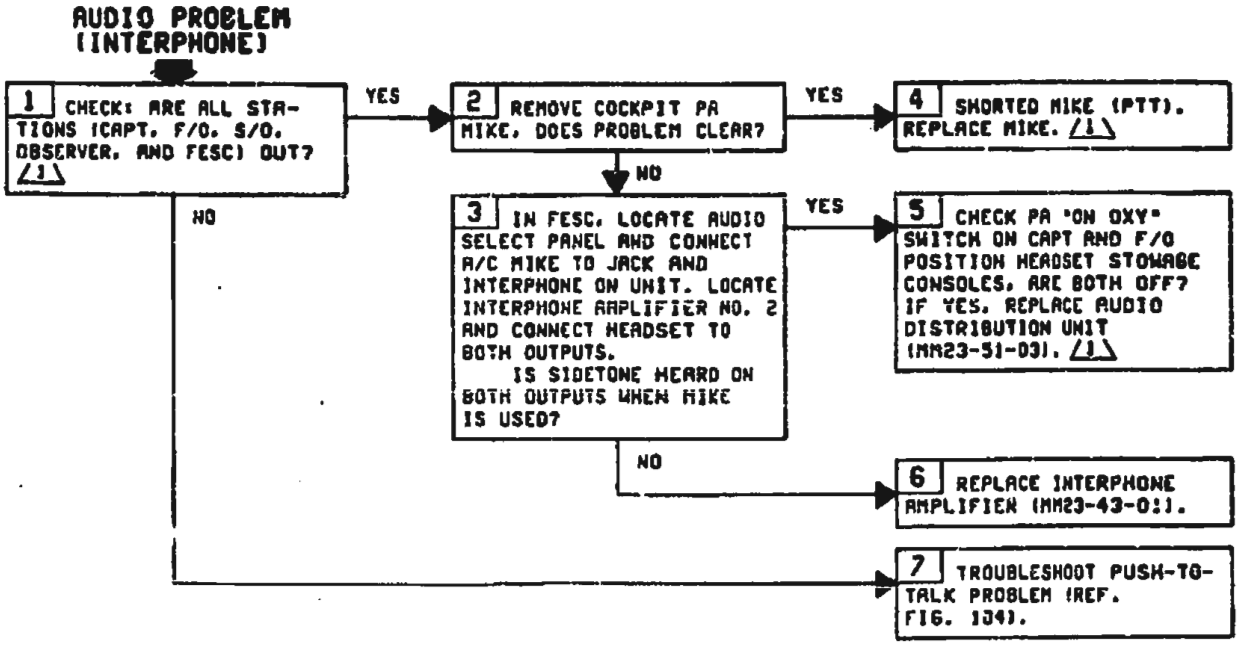


FORWARD ELECTRONICS SERVICE CENTER
REAR RACK

M1-0000-23-3541

Component Locator Diagram
Figure 102 (Sheet 4)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A12, 1A13, 1A14, 1B11,
3C16, 3C17, 3C18
ON PILOTS OVERHEAD PANEL: MASTER RADIO ESSENTIAL SWITCHLIGHT "ON".


AUDIO PROBLEM (INTERPHONE)
1 CHECK: ARE ALL STATIONS (CAPT, F/O, S/O, OBSERVER, AND FESC) OUT? /1\
YES
2 REMOVE COCKPIT PA MIKE. DOES PROBLEM CLEAR?
YES
4 SHORTED MIKE (PTT). REPLACE MIKE. /1\
NO
3 IN FESC, LOCATE AUDIO SELECT PANEL AND CONNECT A/C MIKE TO JACK AND INTERPHONE ON UNIT. LOCATE INTERPHONE AMPLIFIER NO. 2 AND CONNECT HEADSET TO BOTH OUTPUTS.
IS SIDETONE HEARD ON BOTH OUTPUTS WHEN MIKE IS USED?
YES
5 CHECK PA "ON OXY" SWITCH ON CAPT AND F/O POSITION HEADSET STOWAGE CONSOLES. ARE BOTH OFF? IF YES, REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03). /1\
NO
6 REPLACE INTERPHONE AMPLIFIER (MM23-43-01).
NO
7 TROUBLESHOOT PUSH-TO-TALK PROBLEM (REF. FIG. 104).

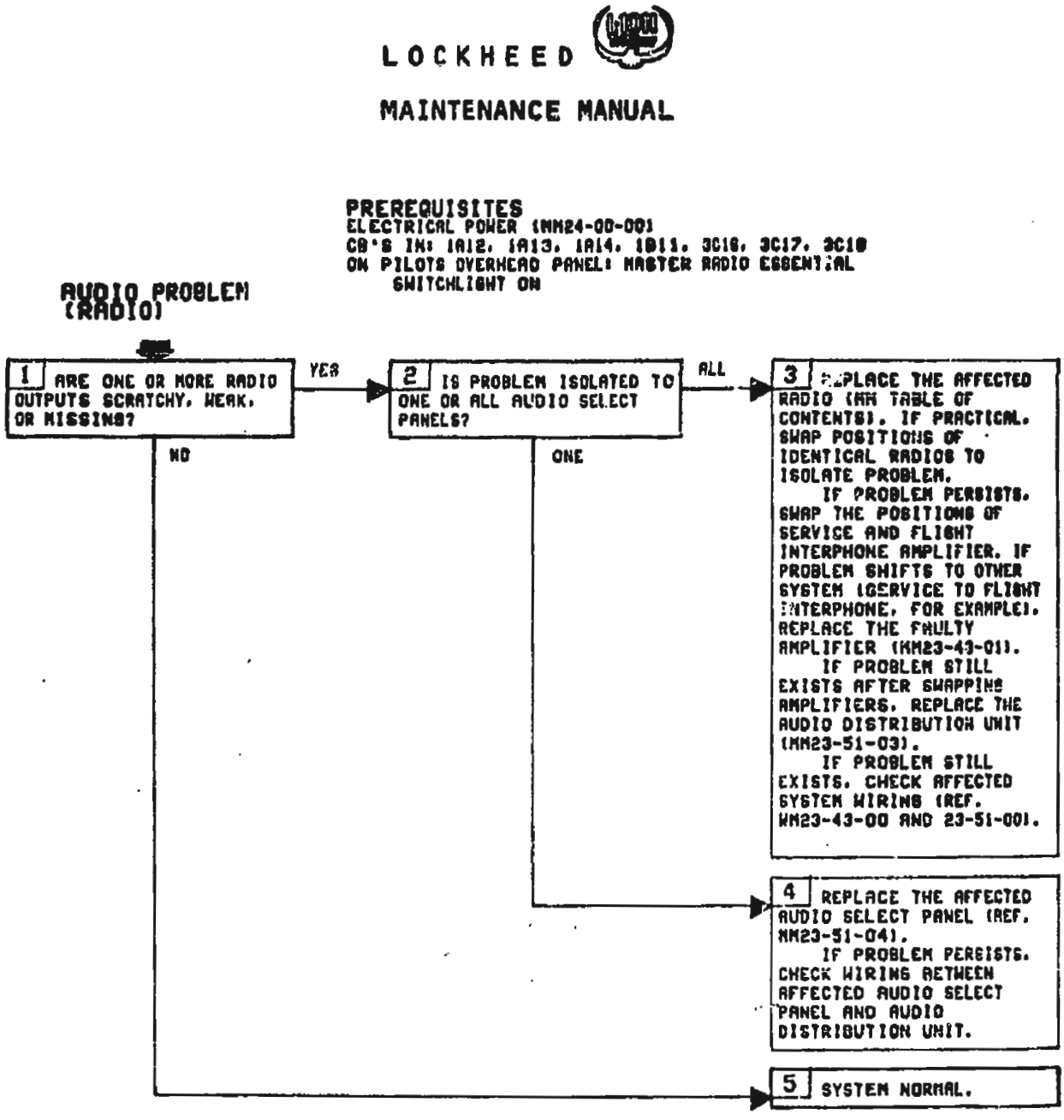
NOTE

/1\ BEFORE REPLACING SYSTEM COMPONENTS, ENSURE MIKE AND HEADSET JACKS ARE NOT LOOSE/DAMAGED AT PROBLEM STATIONS.

MI-0002-23-3240

R Audio Problems (Radio/Interphone)
R Figure 103 (Sheet 1)

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A12, 1A13, 1A14, 1B11, 3C16, 3C17, 3C18
ON PILOTS OVERHEAD PANEL: MASTER RADIO ESSENTIAL SWITCHLIGHT ON


AUDIO PROBLEM (RADIO)
1 ARE ONE OR MORE RADIO OUTPUTS SCRATCHY, WEAK, OR MISSING?
YES
2 IS PROBLEM ISOLATED TO ONE OR ALL AUDIO SELECT PANELS?
ALL
3 REPLACE THE AFFECTED RADIO (MM TABLE OF CONTENTS). IF PRACTICAL, SWAP POSITIONS OF IDENTICAL RADIOS TO ISOLATE PROBLEM.
IF PROBLEM PERSISTS, SWAP THE POSITIONS OF SERVICE AND FLIGHT INTERPHONE AMPLIFIER. IF PROBLEM SHIFTS TO OTHER SYSTEM (SERVICE TO FLIGHT INTERPHONE, FOR EXAMPLE), REPLACE THE FAULTY AMPLIFIER (MM23-43-01).
IF PROBLEM STILL EXISTS AFTER SWAPPING AMPLIFIERS, REPLACE THE AUDIO DISTRIBUTION UNIT (MM23-51-03).
IF PROBLEM STILL EXISTS, CHECK AFFECTED SYSTEM WIRING (REF. MM23-43-00 AND 23-51-00).
NO
ONE
4 REPLACE THE AFFECTED AUDIO SELECT PANEL (REF. MM23-51-04).
IF PROBLEM PERSISTS, CHECK WIRING BETWEEN AFFECTED AUDIO SELECT PANEL AND AUDIO DISTRIBUTION UNIT.
5 SYSTEM NORMAL.

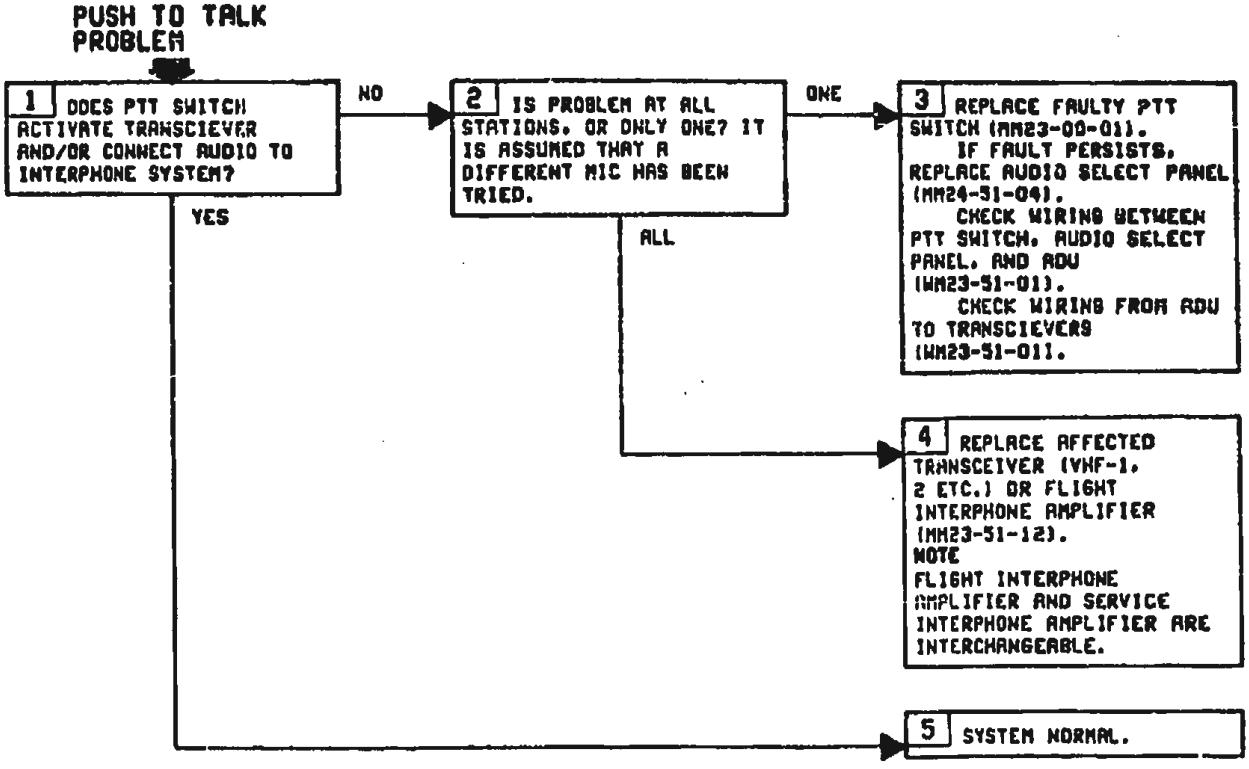
NOTE
DETERMINE THAT HEADSET AND/OR SPEAKERS ARE GOOD PRIOR TO STARTING FAULT ISOLATION.

ONLY CAPTAIN AND F/O RECEIVE RADIO ALTIMETER DECISION HEIGHT (DH) AUDIO TONE.

M1-0004-83-2000

Audio Problems Radio/Interphone)
Figure 103 (Sheet 2)

PREREQUISITES
FUNCTIONAL MIC AVAILABLE
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A12, 1A13, 1A14, 1B11, 3C16, 3C17, 3C18
ON PILOTS OVERHEAD PANEL: MASTER RADIO ESSENTIAL SWITCHLIGHT TO "ON"

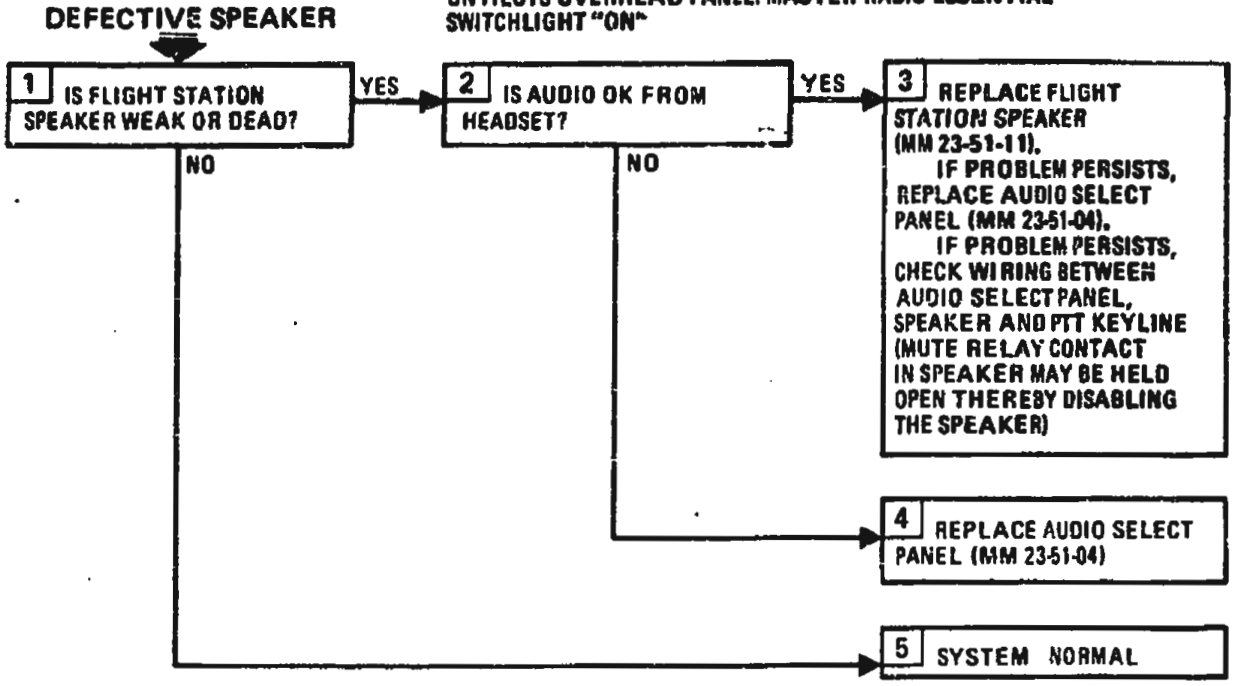

PUSH TO TALK PROBLEM
1 DOES PTT SWITCH ACTIVATE TRANSCIEVER AND/OR CONNECT AUDIO TO INTERPHONE SYSTEM?
NO
YES
2 IS PROBLEM AT ALL STATIONS, OR ONLY ONE? IT IS ASSUMED THAT A DIFFERENT MIC HAS BEEN TRIED.
ONE
ALL
3 REPLACE FAULTY PTT SWITCH (MM23-00-01).
IF FAULT PERSISTS, REPLACE AUDIO SELECT PANEL (MM24-51-04).
CHECK WIRING BETWEEN PTT SWITCH, AUDIO SELECT PANEL, AND ADU (MM23-51-01).
CHECK WIRING FROM ADU TO TRANSCIEVERS (MM23-51-01).
4 REPLACE AFFECTED TRANSCEIVER (VHF-1, 2 ETC.) OR FLIGHT INTERPHONE AMPLIFIER (MM23-51-12).
NOTE
FLIGHT INTERPHONE AMPLIFIER AND SERVICE INTERPHONE AMPLIFIER ARE INTERCHANGEABLE.
5 SYSTEM NORMAL.

M1-0000-23-4259

R Push to Talk Problems
R Figure 104

PREREQUISTES

FUNCTIONAL HEADSET AVAILABLE
ELECTRICAL POWER (MM 24-00-00)
CB'S IN: 1A12, 1A13, 1A14, 1B11, 3C16, 3C17, 3C18
ON PILOTS OVERHEAD PANEL: MASTER RADIO ESSENTIAL SWITCHLIGHT "ON"


DEFECTIVE SPEAKER
1 IS FLIGHT STATION SPEAKER WEAK OR DEAD?
YES
2 IS AUDIO OK FROM HEADSET?
YES
3 REPLACE FLIGHT STATION SPEAKER (MM 23-51-11).
IF PROBLEM PERSISTS, REPLACE AUDIO SELECT PANEL (MM 23-51-04).
IF PROBLEM PERSISTS, CHECK WIRING BETWEEN AUDIO SELECT PANEL, SPEAKER AND PTT KEYLINE (MUTE RELAY CONTACT IN SPEAKER MAY BE HELD OPEN THEREBY DISABLING THE SPEAKER)
NO
NO
4 REPLACE AUDIO SELECT PANEL (MM 23-51-04)
5 SYSTEM NORMAL

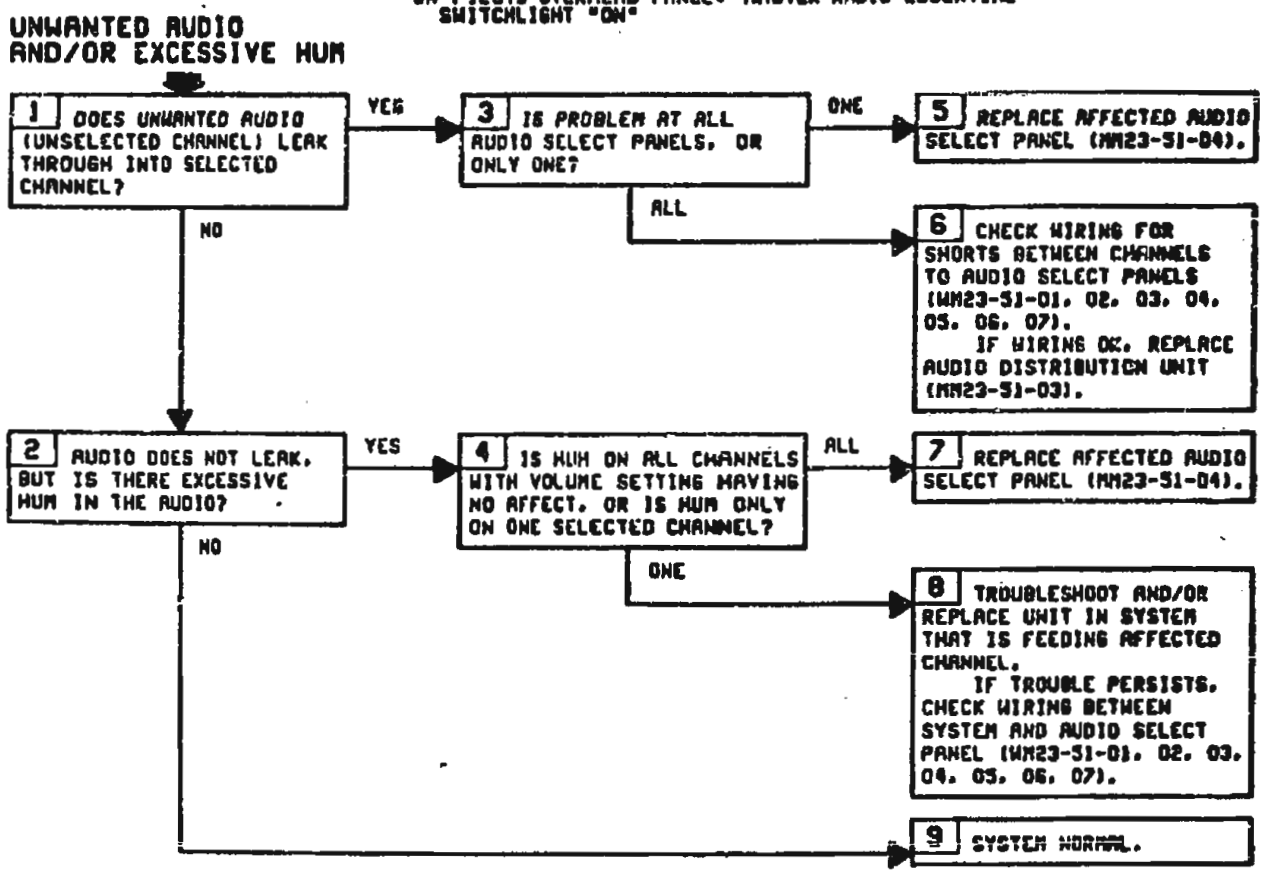
MI-0002-23-2102

R Defective Flight Station Speaker
R Figure 105

EFFECTIVITY: ALL

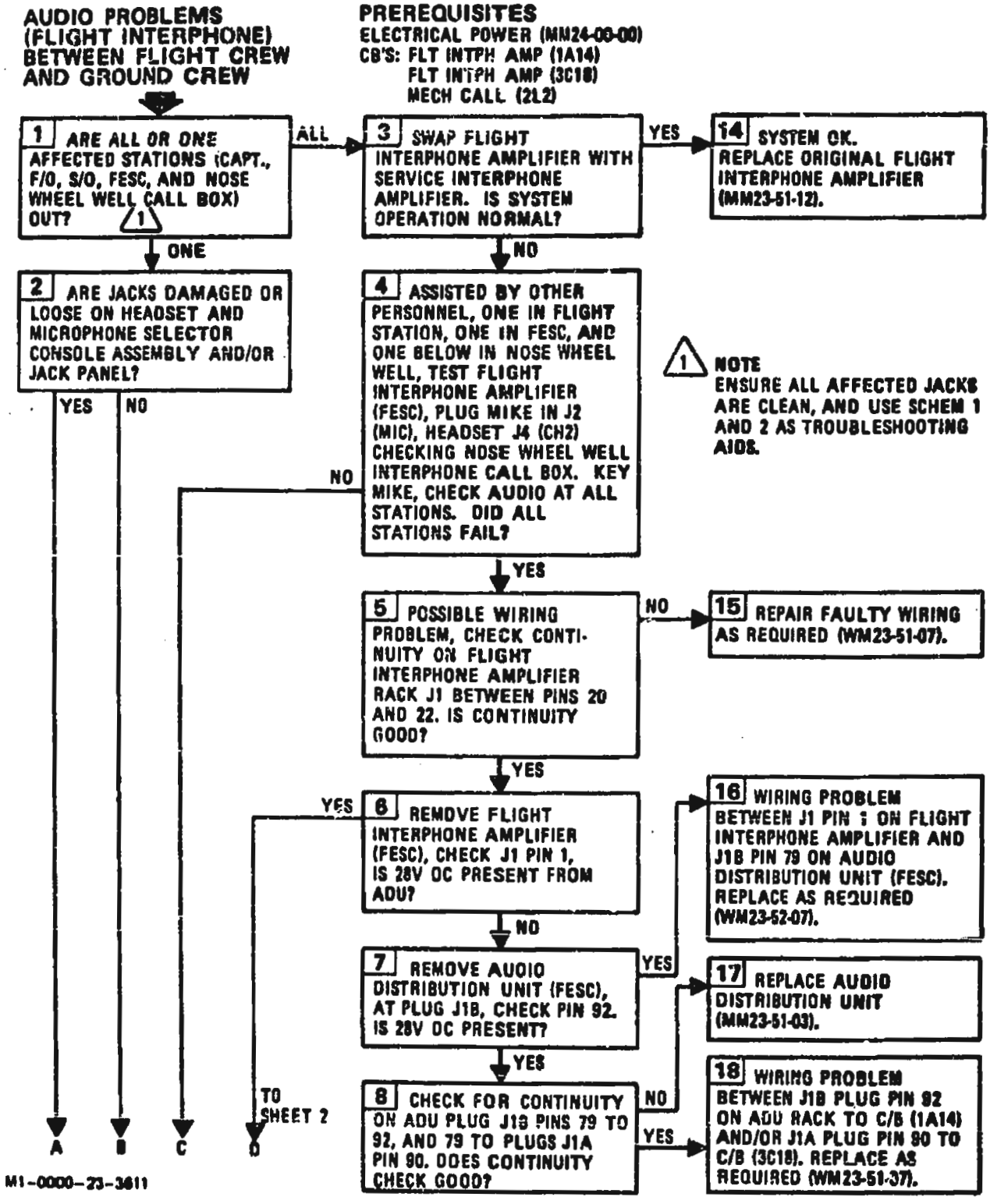
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 1A12, 1A13, 1A14, 1B11, 3C16, 3C17, 3C18
ON PILOTS OVERHEAD PANEL: MASTER RADIO ESSENTIAL SWITCHLIGHT "ON"

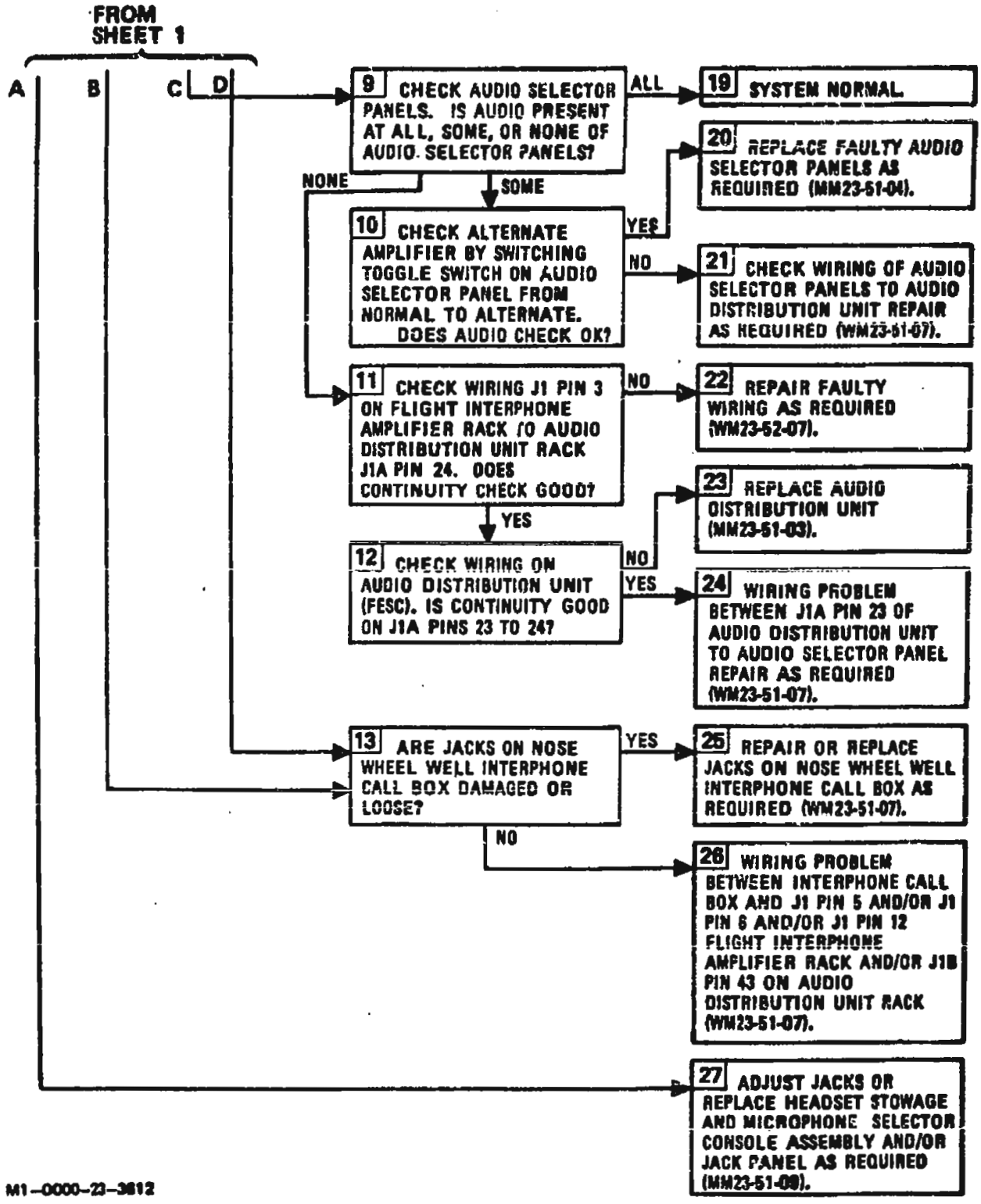

UNWANTED AUDIO AND/OR EXCESSIVE HUM
1 DOES UNWANTED AUDIO (UNSELECTED CHANNEL) LEAK THROUGH INTO SELECTED CHANNEL?
YES
3 IS PROBLEM AT ALL AUDIO SELECT PANELS, OR ONLY ONE?
ONE
5 REPLACE AFFECTED AUDIO SELECT PANEL (MM23-51-04).
ALL
6 CHECK WIRING FOR SHORTS BETWEEN CHANNELS TO AUDIO SELECT PANELS (MM23-51-01, 02, 03, 04, 05, 06, 07).
IF WIRING OK, REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
NO
2 AUDIO DOES NOT LEAK, BUT IS THERE EXCESSIVE HUM IN THE AUDIO?
YES
4 IS HUM ON ALL CHANNELS WITH VOLUME SETTING HAVING NO AFFECT, OR IS HUM ONLY ON ONE SELECTED CHANNEL?
ALL
7 REPLACE AFFECTED AUDIO SELECT PANEL (MM23-51-04).
ONE
8 TROUBLESHOOT AND/OR REPLACE UNIT IN SYSTEM THAT IS FEEDING AFFECTED CHANNEL.
IF TROUBLE PERSISTS, CHECK WIRING BETWEEN SYSTEM AND AUDIO SELECT PANEL (MM23-51-01, 02, 03, 04, 05, 06, 07).
NO
9 SYSTEM NORMAL.

RI-0003-23-2113

R Unwanted Audio and/or Excessive Hum
R Figure 106

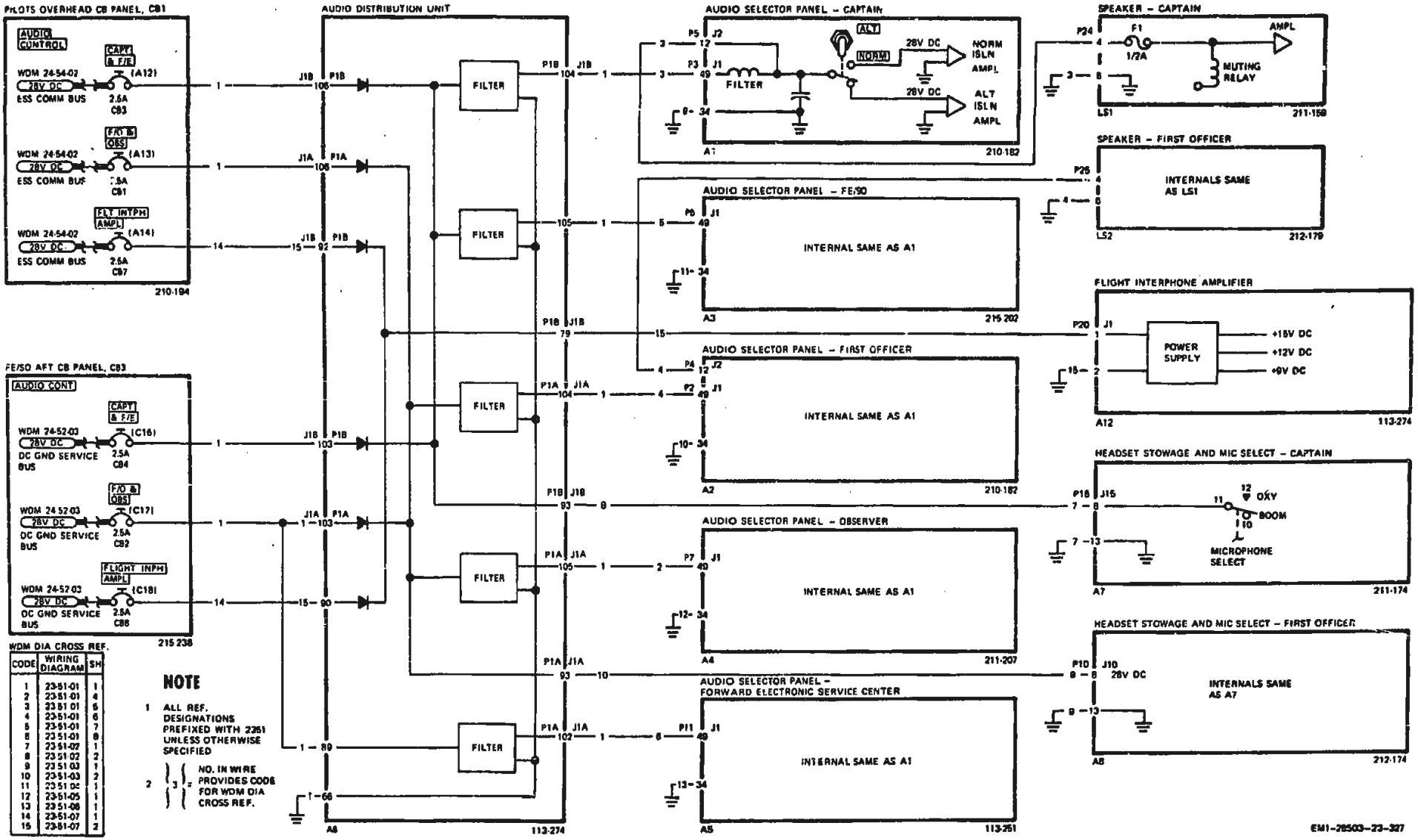

AUDIO PROBLEMS (FLIGHT INTERPHONE) BETWEEN FLIGHT CREW AND GROUND CREW
PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: FLT INTPH AMP (1A14)
FLT INTPH AMP (3C18)
MECH CALL (2L2)
1 ARE ALL OR ONE AFFECTED STATIONS (CAPT., F/O, S/O, FESC, AND NOSE WHEEL WELL CALL BOX) OUT? 1
ALL
ONE
2 ARE JACKS DAMAGED OR LOOSE ON HEADSET AND MICROPHONE SELECTOR CONSOLE ASSEMBLY AND/OR JACK PANEL?
YES
NO
3 SWAP FLIGHT INTERPHONE AMPLIFIER WITH SERVICE INTERPHONE AMPLIFIER. IS SYSTEM OPERATION NORMAL?
YES
14 SYSTEM OK. REPLACE ORIGINAL FLIGHT INTERPHONE AMPLIFIER (MM23-51-12).
NO
4 ASSISTED BY OTHER PERSONNEL, ONE IN FLIGHT STATION, ONE IN FESC, AND ONE BELOW IN NOSE WHEEL WELL, TEST FLIGHT INTERPHONE AMPLIFIER (FESC), PLUG MIKE IN J2 (MIC), HEADSET J4 (CH2) CHECKING NOSE WHEEL WELL INTERPHONE CALL BOX. KEY MIKE, CHECK AUDIO AT ALL STATIONS. DID ALL STATIONS FAIL?
NO
YES
1 NOTE
ENSURE ALL AFFECTED JACKS ARE CLEAN, AND USE SCHEM 1 AND 2 AS TROUBLESHOOTING AIDS.
5 POSSIBLE WIRING PROBLEM, CHECK CONTINUITY ON FLIGHT INTERPHONE AMPLIFIER RACK J1 BETWEEN PINS 20 AND 22. IS CONTINUITY GOOD?
NO
15 REPAIR FAULTY WIRING AS REQUIRED (WM23-51-07).
YES
6 REMOVE FLIGHT INTERPHONE AMPLIFIER (FESC), CHECK J1 PIN 1, IS 28V DC PRESENT FROM ADU?
YES
16 WIRING PROBLEM BETWEEN J1 PIN 1 ON FLIGHT INTERPHONE AMPLIFIER AND J1B PIN 79 ON AUDIO DISTRIBUTION UNIT (FESC). REPLACE AS REQUIRED (WM23-52-07).
NO
7 REMOVE AUDIO DISTRIBUTION UNIT (FESC), AT PLUG J1B, CHECK PIN 92. IS 28V DC PRESENT?
YES
17 REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
YES
8 CHECK FOR CONTINUITY ON ADU PLUG J1B PINS 79 TO 92, AND 79 TO PLUGS J1A PIN 90. DOES CONTINUITY CHECK GOOD?
NO
18 WIRING PROBLEM BETWEEN J1B PLUG PIN 92 ON ADU RACK TO C/B (1A14) AND/OR J1A PLUG PIN 90 TO C/B (3C18). REPLACE AS REQUIRED (WM23-51-37).
TO SHEET 2
A
B
C
D
M1-0000-23-3611

Audio Problems (Flight Interphone)
Figure 107 (Sheet 1)


FROM SHEET 1
A
B
C
D
9 CHECK AUDIO SELECTOR PANELS. IS AUDIO PRESENT AT ALL, SOME, OR NONE OF AUDIO SELECTOR PANELS?
ALL
19 SYSTEM NORMAL.
NONE
SOME
20 REPLACE FAULTY AUDIO SELECTOR PANELS AS REQUIRED (MM23-51-04).
10 CHECK ALTERNATE AMPLIFIER BY SWITCHING TOGGLE SWITCH ON AUDIO SELECTOR PANEL FROM NORMAL TO ALTERNATE. DOES AUDIO CHECK OK?
YES
NO
21 CHECK WIRING OF AUDIO SELECTOR PANELS TO AUDIO DISTRIBUTION UNIT REPAIR AS REQUIRED (WM23-51-07).
11 CHECK WIRING J1 PIN 3 ON FLIGHT INTERPHONE AMPLIFIER RACK TO AUDIO DISTRIBUTION UNIT RACK J1A PIN 24. DOES CONTINUITY CHECK GOOD?
NO
22 REPAIR FAULTY WIRING AS REQUIRED (WM23-52-07).
YES
12 CHECK WIRING ON AUDIO DISTRIBUTION UNIT (FESC). IS CONTINUITY GOOD ON J1A PINS 23 TO 24?
NO
23 REPLACE AUDIO DISTRIBUTION UNIT (MM23-51-03).
YES
24 WIRING PROBLEM BETWEEN J1A PIN 23 OF AUDIO DISTRIBUTION UNIT TO AUDIO SELECTOR PANEL REPAIR AS REQUIRED (WM23-51-07).
13 ARE JACKS ON NOSE WHEEL WELL INTERPHONE CALL BOX DAMAGED OR LOOSE?
YES
25 REPAIR OR REPLACE JACKS ON NOSE WHEEL WELL INTERPHONE CALL BOX AS REQUIRED (WM23-51-07).
NO
26 WIRING PROBLEM BETWEEN INTERPHONE CALL BOX AND J1 PIN 5 AND/OR J1 PIN 6 AND/OR J1 PIN 12 FLIGHT INTERPHONE AMPLIFIER RACK AND/OR J1B PIN 43 ON AUDIO DISTRIBUTION UNIT RACK (WM23-51-07).
27 ADJUST JACKS OR REPLACE HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLE ASSEMBLY AND/OR JACK PANEL AS REQUIRED (MM23-51-09).
M1-0000-23-3812

Audio Problems (Flight Interphone)
Figure 107 (Sheet 2)

R
R
001B EFFECTIVITY: ALL



WDM DIA CROSS REF.

CODE	WIRING DIAGRAM	SH
1	23-51-01	1
2	23-51-01	4
3	23-51-01	5
4	23-51-01	6
5	23-51-01	7
6	23-51-01	8
7	23-51-02	1
8	23-51-02	2
9	23-51-03	1
10	23-51-03	2
11	23-51-04	1
12	23-51-05	1
13	23-51-06	1
14	23-51-07	1
15	23-51-07	2

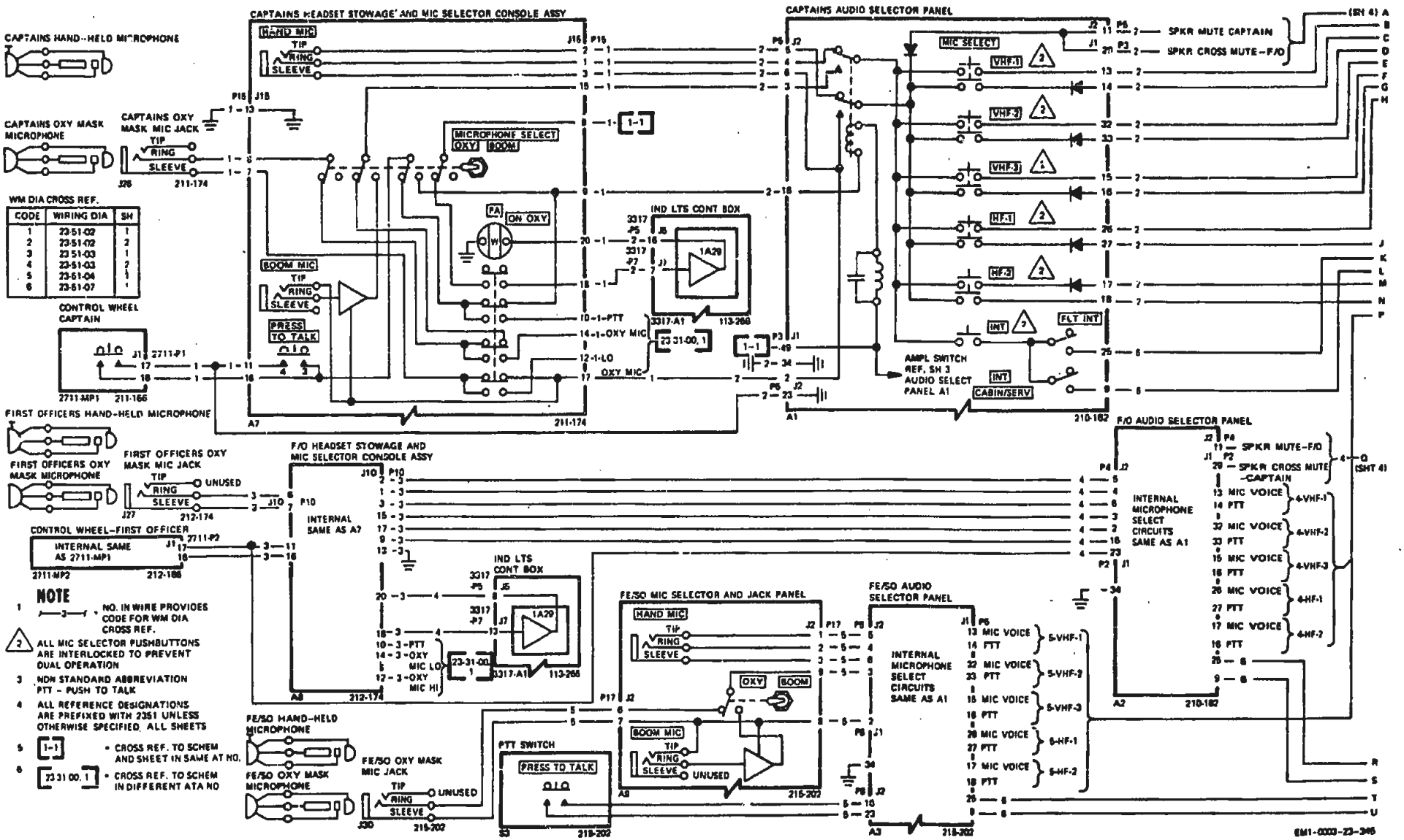
NOTE

1 ALL REF. DESIGNATIONS PREFIXED WITH 2251 UNLESS OTHERWISE SPECIFIED

2 } 3 } = NO. IN WIRE PROVIDES CODE FOR WDM DIA CROSS REF.

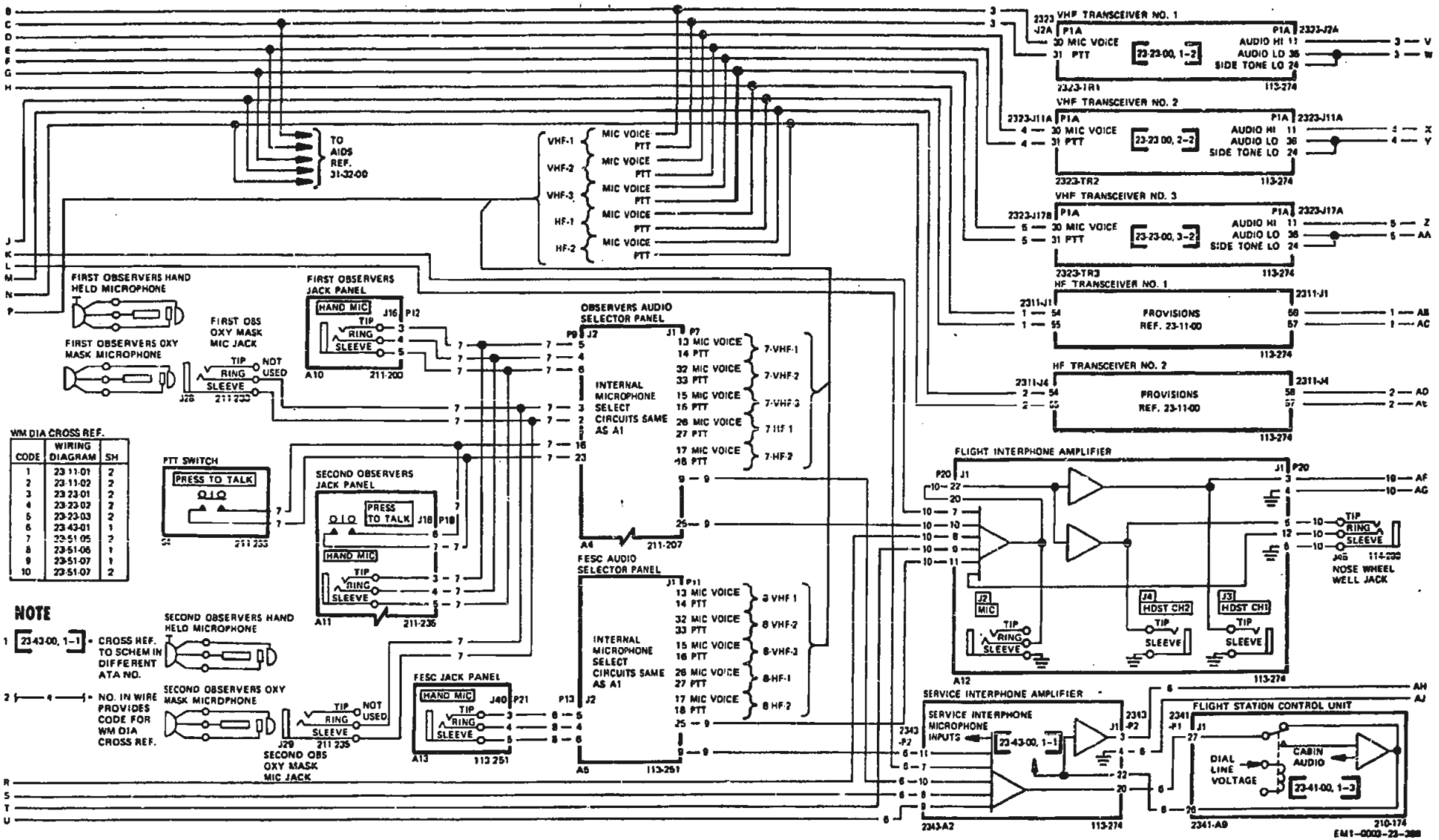
Audio Integrating System Power Distribution Schematic
SCHEM 1

R EFFECTIVITY: ALL
R
0018



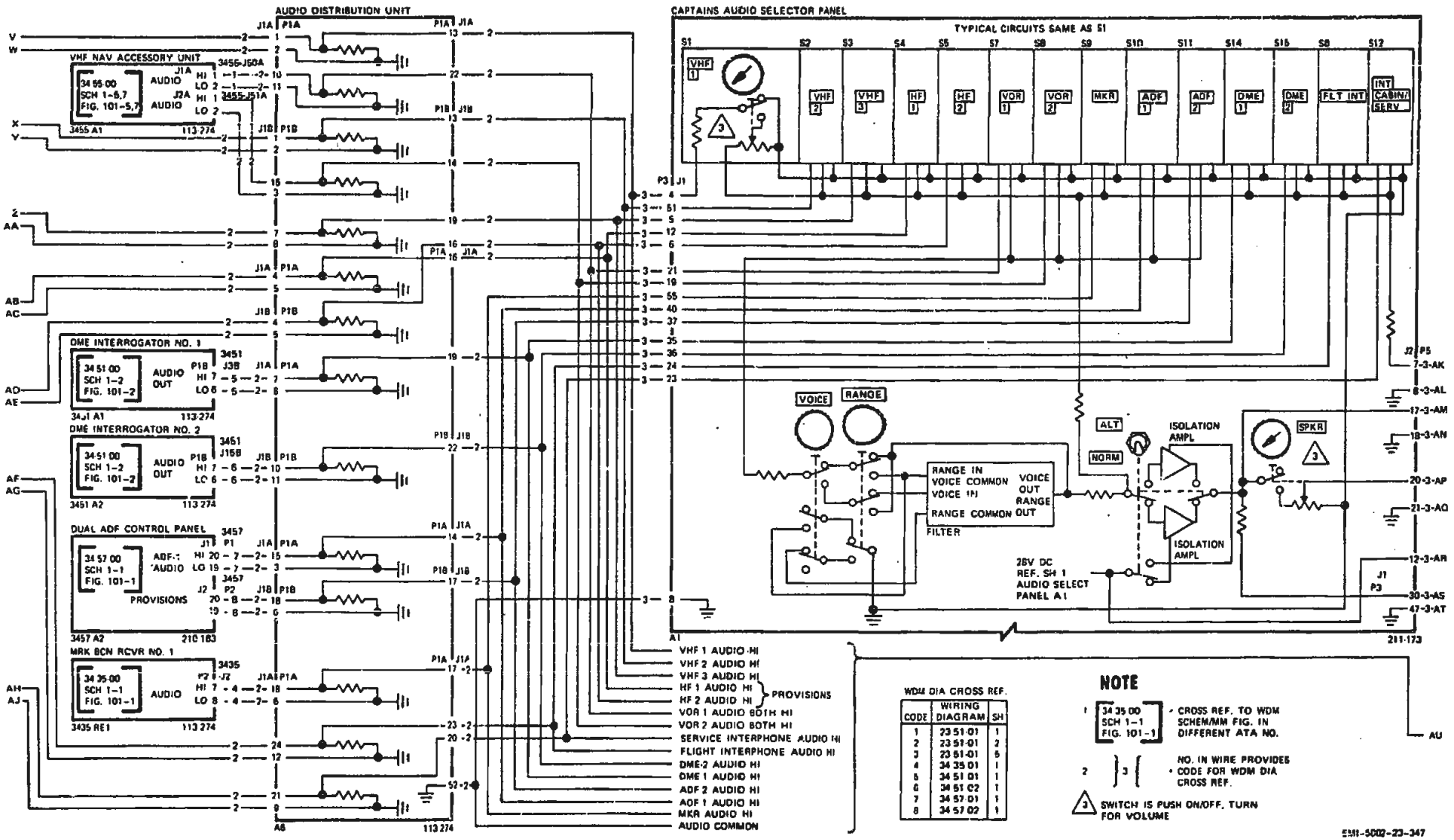
Audio Integrating System Schematic
SCHEM 2 (Sheet 1)

R EFFECTIVITY: ALL
R
001B



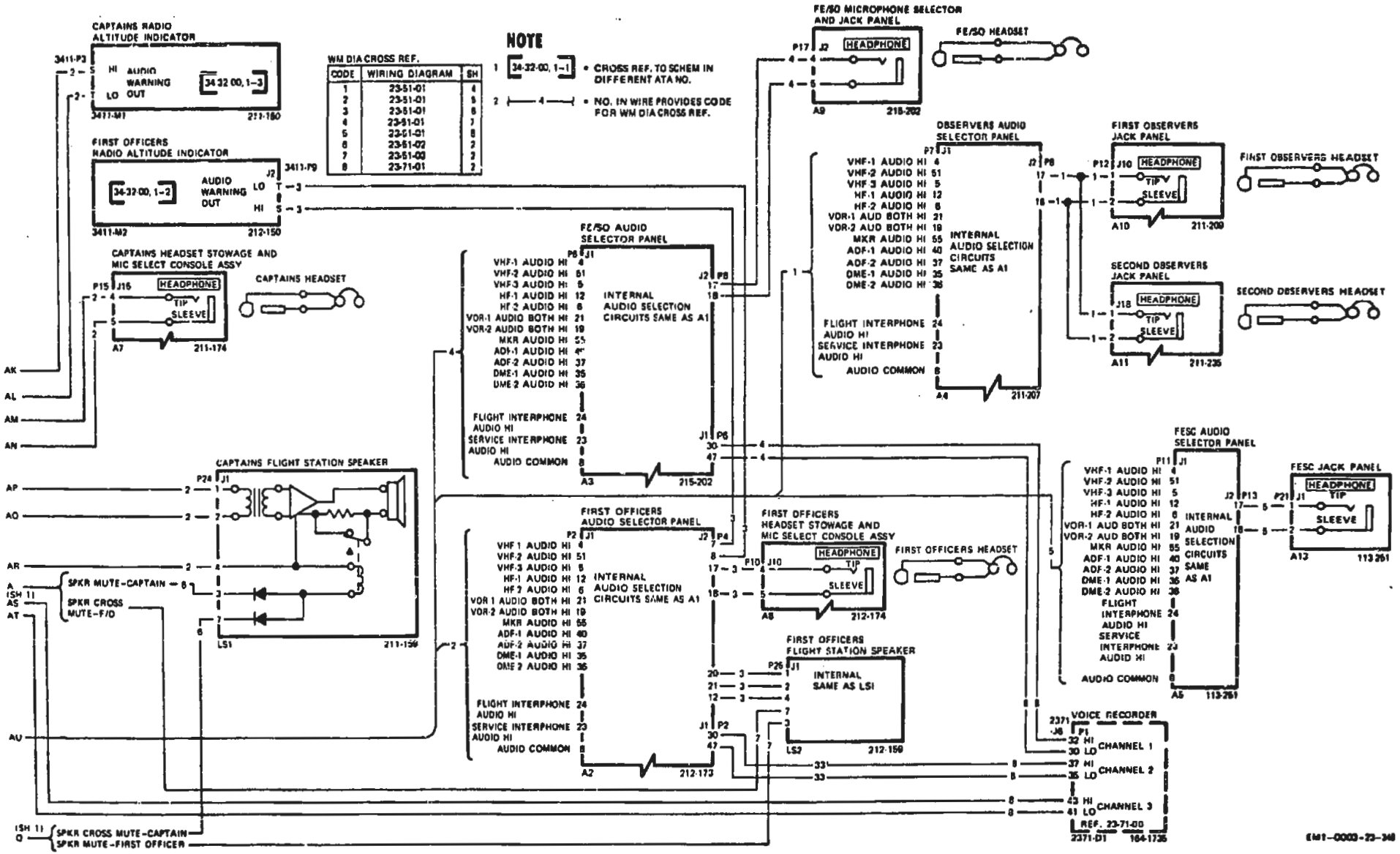
Audio Integrating System Schematic
SCHEM 2 (Sheet 2)

R EFFECTIVITY: ALL
R
001B



Audio Integrating System Schematic
SCHEM 2 (Sheet 3)

R EFFECTIVITY: ALL
R
001B



Audio Integrating System Schematic
SCHEM 2 (Sheet 4)

R EFFECTIVITY: ALL
R
001B

AUDIO INTEGRATING SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

	21-25-00	Electronic and Electrical Service Centers Exhaust Systems - Adjustment and Test
CR CR	23-11-00	HF Communication System - Adjustment and Test (HF equipped aircraft only)
	23-23-00	VHF Communication System - Adjustment and Test
	23-41-00	Cabin and Galley Interphone System - Adjustment and Test
	23-43-00	Service Interphone System - Adjustment and Test
	24-00-00	Electrical Power - Maintenance Practices
	34-32-00	Radio Altimeter System - Adjustment and Test
	34-35-00	Marker Beacon System - Adjustment and Test
	34-51-00	Distance Measuring Equipment (DME) - Adjustment and Test
	34-55-00	VOR System - Adjustment and Test
	34-57-00	Automatic Direction Finder (ADF) System - Adjustment and Test

2. Adjustment/Test

A. Operational Test

NOTE: Audio integrating system operational test can be combined with operational tests of HF (all HF equipped aircraft) and VHF communication systems, passenger audio entertainment and service system, cabin and galley and service interphone systems, radio altimeter system, marker beacon system, ILS, DME, VOR system, and ADF system.

(1) Turn on electrical power (Ref. 24-00-00).

(2) Verify exhaust air flow at forward electronic service center exhaust air outlet ahead of right nosewheel well door, and at mid electrical service center exhaust air

outlet on bottom of left wing leading edge fillet (feel for air flow with hand - Ref. 21-25-00).

(3) Verify that the following systems are turned on:

HF communication system (HF equipped aircraft only - Ref. 23-11-00).

VHF communication system (Ref. 23-23-00).

Cabin and galley interphone system (Ref. 23-41-00).

Service interphone system (Ref. 23-43-00).

Radio altimeter system (Ref. 34-32-00).

Marker beacon system (Ref. 34-35-00).

Distance measuring equipment (Ref. 34-51-00).

VOR system (Ref. 34-55-00).

Automatic direction finder system (Ref. 34-57-00).

(4) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12) and F/O & OBS (A13); and FLT INTPH AMPL (A14) are closed.

On FE/SO aft circuit breaker panel CB3, zone 215, verify that circuit breakers AUDIO CONT - CAPT & F/E (C16), F/O & OBS (C17), and FLT INTPH AMPL (C18) are closed.

R R (5) Engage the MASTER RADIO - ESSENTIAL and No. 2 switches on the pilots overhead panel.

R (6) On all flight station audio selector panels, zones 210 and 215, depress MIC SEL INT, FLT INT, and SPKR controls, and adjust volume as necessary in headsets. Select all NORM/ALT switches to ALT, and release all VOICE and RANGE controls.

NOTE: In following steps, verify that audio selectors will control volume through complete range from cutoff to full volume.

R Captains and First Officers flight station speakers must be muted at Steps (7) through (10).

R (7) At Captains position, depress hand-held microphone PTT switch and speak into microphone. Listen to flight

interphone audio on headsets at each flight station crewmember position, and at nosewheel well service interphone handset.

Verify that audio (including sidetone in Captains headset) is loud and clear at all positions.

Repeat test with NORM/ALT switches in NORM.

CR (8) Deleted.

R (9) On Captains headset stowage and microphone selector console, select OXY/BOOM switch to OXY, and release PA ON OXY switchlight. Depress console PRESS TO TALK switch and speak into oxygen mask microphone.

Verify that sidetone audio is loud and clear.

(10) Repeat Steps (7) through (9) at First Officers position.

R (11) At First Observers, and then Second Observers positions, depress hand-held microphone PTT switch and speak into microphone.

Verify that sidetone audio is loud and clear, and that audio is loud and clear in Captains and First Officers speakers.

R (12) Release SPKR controls on Captains and First Officers audio selector panels.

R (13) At First Observers, and then Second Observers positions, depress PRESS TO TALK switch and speak into oxygen mask microphone.

Verify that sidetone audio is loud and clear.

R (14) At FE/SO position, depress hand-held microphone PTT switch and speak into microphone.

Verify that sidetone audio is loud and clear.

CR (15) Deleted.

Verify that sidetone audio is loud and clear.

R (16) Select FE/SO OXY/BOOM switch to OXY. Depress PRESS TO TALK and speak into oxygen mask microphone.

Verify that sidetone audio is loud and clear.

R (17) On FE/SO microphone selector and jack panel, depress service interphone ON switchlight, and connect a service interphone handset at the SERVICE INTERPHONE
R jack. On audio selector panel, depress INT CABIN/SERV and adjust volume as necessary.

Key service interphone microphone, and verify that audio is loud and clear between service interphone and flight interphone.

R (18) On pilots center console, lift cabin and galley interphone handset from cradle.

Verify that audio is loud and clear between cabin and galley interphone and flight interphone. Release FLT INT and INT CABIN SERV controls on all flight station audio selector panels.

R (19) Tune VOR No. 1 and No. 2 to any local station (Ref. 34-55-00). If no local VOR station can be received,
R connect test set to give VOR audio output. On all flight station audio selector panels, depress VOR 1 controls and adjust volume as necessary, and depress VOICE control.

Verify that VOR audio is loud and clear at all flight station positions.

Release VOR 1 controls, and repeat step for VOR 2.

Release VOR 2 controls.

R (20) With VOR No. 1 and No. 2 still tuned to any local station, depress DME 1 controls on all flight station audio selector panels, and adjust volume as necessary. (If no local DME station can be received, connect test set to give DME audio output, Ref. 34-51-00).

Verify that DME audio is loud and clear at all flight station positions.

Release DME 1 controls, and repeat step for DME 2.

Release DME 2 controls.

R (21) Select any authorized frequency on VHF No. 1, No. 2, and No. 3 (Ref. 23-23-00). On all flight station audio selector panels, depress MIC SEL - VHF 1 and VHF 1 audio controls. Adjust volume as necessary. Key any flight station microphone and make a test count.

Verify that VHF sidetone is loud and clear at all flight station positions.

Release VHF 1 controls, and repeat step for VHF 2 and 3.

Release VHF controls.

CR (22) On HF equipped aircraft, select any authorized frequency on HF No. 1 and No. 2 (Ref. 23-11-00). On all flight station audio selector panels, depress MIC SEL - HF 1 and HF 1 audio controls. Adjust volume as necessary. Key any flight station microphone and make test count.

Verify that HF sidetone is loud and clear at all flight station positions.

Release HF 1 controls, and repeat step for HF 2.

Release HF 2 controls.

R (23) Select any local commercial AM broadcast station on ADF No. 1, and any range station on ADF No. 2 (Ref.
R 34-57-00) (For CW range stations, select BFO on). On all flight station audio selector panels, depress ADF 1 controls and adjust volume as necessary.

Verify that ADF 1 broadcast audio is loud and clear at all flight station positions.

On all audio selector panels, depress VOICE controls.

Verify that ADF 1 audio remains loud and clear.

Release VOICE controls. Depress RANGE controls.

Verify that ADF 1 audio level decreases.

Select B on V/B/R controls, and release ADF 1 controls. Release RANGE and ADF 1 controls.

R (24) On all flight station audio selector panels depress ADF 2.

Verify that ADF 2 range audio is loud and clear.

Depress RANGE controls.

Verify that ADF 2 audio remains loud and clear. Release RANGE controls. Depress VOICE controls.

Verify that ADF 2 audio level decreases. Release VOICE controls.

R (25) On all flight station audio selector panels, depress MKR controls and adjust volume as necessary.

In FESC at flight station door surround, zone 113, connect microphone and headset at jack panel below audio selector panel; and depress MKR control and adjust volume as necessary.

At rear rack, bottom shelf, locate marker beacon receiver and depress TEST switch (Ref. 34-35-00).

Verify that marker beacon test tones are loud and clear in FESC and at all flight station positions.

Release MKR controls.

R (26) On FESC flight station door surround aft of audio selector panel, connect service interphone handset at SERVICE INTERPHONE jack. On audio selector panel depress MIC SEL - INT and INT CABIN SERV audio control, and adjust volume as necessary.

Verify that audio is loud and clear between flight interphone and service interphone.

Release INT CABIN SERV.

R (27) One at a time on FESC audio selector panel, depress VOR 1 and 2, ADF 1 and 2, and DME 1 and 2, listen for audio, and then release controls.

Verify that all audio signals are loud and clear.

R (28) One at a time on FESC audio selector panel, depress MIC SEL and audio selector controls for VHF 1, 2, and 3;
C and HF 1 and 2 (HF equipped aircraft). For each transceiver, key microphone and make test count; then release controls.

Verify that all sidetone audio signals are loud and clear.

R (29) In flight station at Captains and First Officers positions, adjust radio altimeter indicator SET knobs to full counterclockwise position for a selected decision height (DH) of below zero feet. Do not apply excessive force once the knob is at the full counterclockwise position. Check that DH readout is masked, then perform the following:

(a) On pilots overhead CB panel, CB1, open NO. 1 NAVIGATION RADIO ALTM (D4) and NO. 2 NAVIGATION RADIO ALTM (D22).

(b) Close NO. 1 NAVIGATION RADIO ALTM (D4) and verify that DH audio tone is loud and clear in the Captains headset.

(c) Open NO. 1 NAVIGATION RADIO ALTM (D4) and close NO. 2 NAVIGATION RADIO ALTM (D22). Verify that DH audio tone is loud and clear in the F/Os headset.

(d) Close NO. 1 NAVIGATION RADIO ALTM (D4), then using the SET knob on both radio altimeters, increase the selected decision height to a point where DH audio ceases.

R (30) On pilots overhead panel, disengage MASTER RADIO
R ESSENTIAL and No. 2 switches.

R (31) Release all audio selector panel controls. Stow all headsets, hand-held microphones, and oxygen masks. Disconnect all service interphone handsets and turn off service interphone (Release SERVICE INTERPHONE - ON switchlight - Ref. 23-43-00).

Turn service interphone off (release SERVICE INTERPHONE - ON switchlight - Ref. 23-43-00), electrical power off (Ref. 24-00-00), DME to standby (mode selector to STBY - Ref. 34-51-00), and ADF system off (mode selector switch OFF - Ref. 34-57-00). Close all doors and access panels opened for test.

C 3. Interphone Hum Check

C A. General

C (1) This check is a procedure to establish the level of 400
C cycle leakage from aircraft wiring into the flight and
C service interphone system.

C (2) If hum measured exceeds the established limit, the
C cause of the unwanted leakage must be located and
C corrected. Such problems are usually caused by
C defective shielding or poor grounding in the interphone
C wiring.

C B. Hum Check

C (1) Establish that power is available at the aircraft
C buses, and that all communication and navigation and
C interphone circuit breakers are activated.

C (2) At the captains audio selector panel, select the
C microphone to INTERPHONE, and push on the FLT INT and
C INT CABIN/SERV pushbuttons. All other system
C selections must be OFF. Set the audio selector panel
C volume control to mid position.

C (3) Using a phone plug which has a 500 ohm resistor
C paralleled with an audio millwatt meter, connect to the
C captains headphone jack.

C (4) The measured level must not exceed 15 millvolts (.015
C v.). Record the value obtained.

C (5) Perform the same check at all cockpit audio selector
C panel positions. Record the values obtained.

C (6) Any value exceeding .015v must be correct to meet this
C specification.

AUDIO DISTRIBUTION UNIT - REMOVAL AND INSTALLATION

1. Referenced procedures

23-31-00	Passenger Address System - Adjustment and Test
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal

R (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12) and F/O & OBS (A13); and ESSENTIAL COMMUNICATIONS BUS - FLT INTPH AMPL (A14), PA - NO. 1 (A15) and PA - NO. 2 (A16).

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers AUDIO CONT - CAPT & F/E (C16), F/O & OBS (C17), and FLT INTPH AMPL (C18).

(2) In forward electronic service center at rear rack bottom shelf, zone 113, locate audio distribution unit, loosen knurled thumbscrew and disengage from mounting bracket.

(3) Pull unit forward until rear connector disengages.

(4) Remove audio distribution unit.

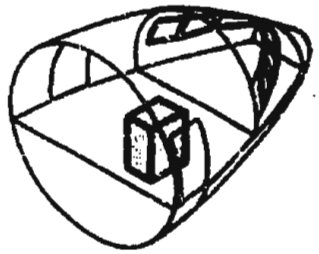
B. Installation

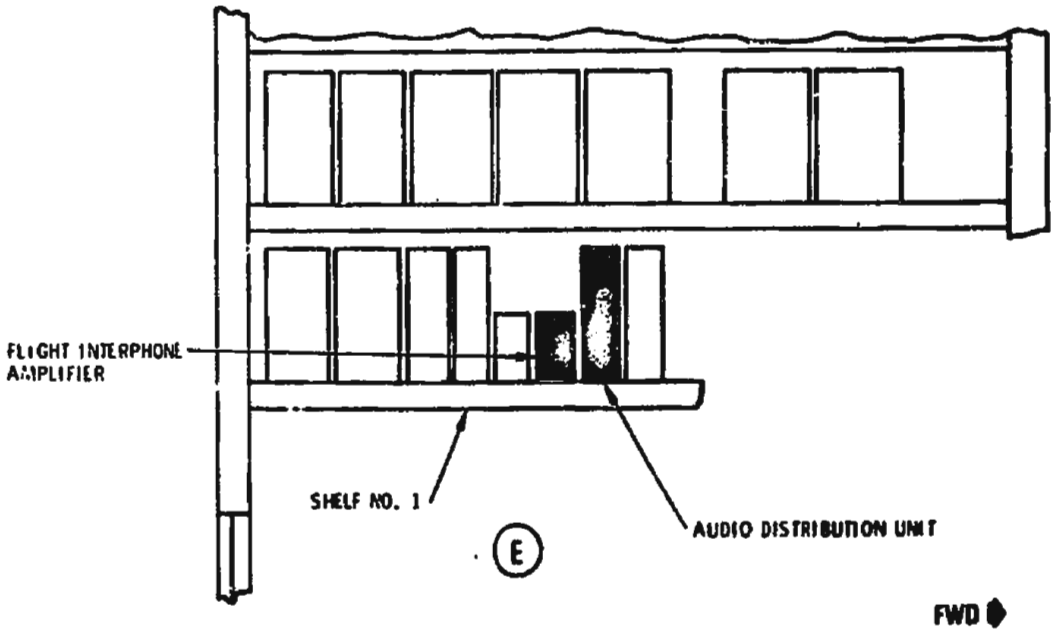
(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Position audio distribution unit and slide unit into rack until connectors mate.

(3) Engage thumbscrew on mounting bracket at front of audio distribution unit. Tighten thumbscrew and secure unit in rack.

(4) Remove tags and close circuit breakers opened in Step 2A(1).





FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING FORWARD

M1-0101-23-415

R Audio Distribution Unit - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

(5) Turn on electrical power (Ref. 24-00-00).

(6) Perform operational tests of Passenger Address System (Ref. 23-31-00) and Audio Integrating System (Ref. 23-51-00).

(7) Turn off electrical power (Ref. 24-00-00).

AUDIO SELECTOR PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedure

23-51-00 Audio Integrating System - Adjustment and Test

23-71-00 Voice Recorder System - Adjustment and Test

2. Removal/Installation

A. Removal of Audio Selector Panel - Captain or Flight Engineer/Second Officer

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12), and FLT INTPH AMPL (A14).

R (2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers AUDIO CONT - CAPT & F/E (C16) and FLT INTPH AMPL (C18).

(3) Release half-turn mounting fasteners and lift audio selector panel from mount (Ref. Fig. 401).

(4) Disconnect electrical connectors from back of audio selector panel and remove panel.

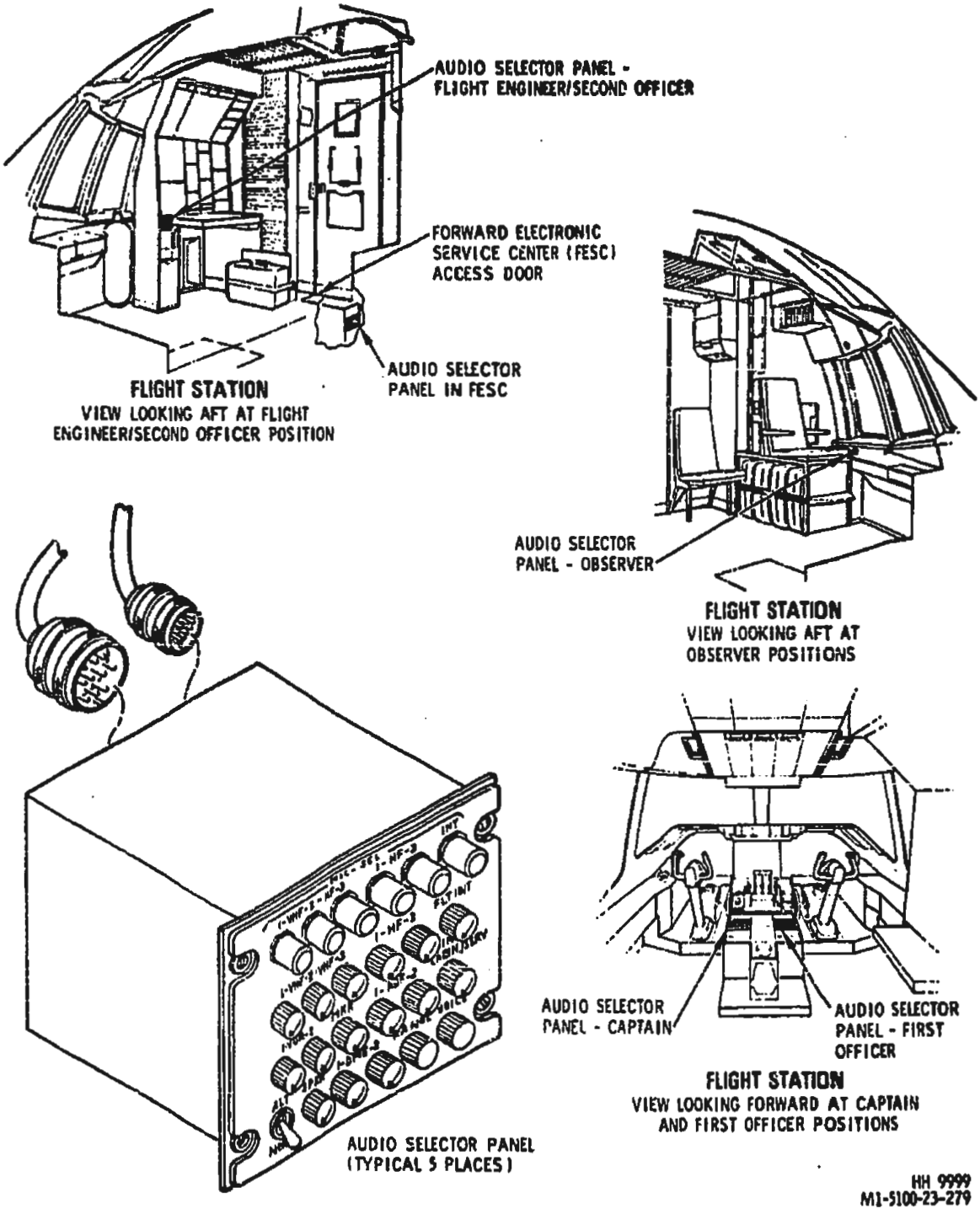
B. Removal of Audio Selector Panel - First Officer, Observer, or Forward Electronic Service Center

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - F/O & OBS (A13), and FLT INTPH AMPL (A14).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers AUDIO CONT - F/O & OBS (C17), and FLT INTPH AMPL (C18).

(3) Release half-turn mounting fasteners and lift audio selector panel from mount (Ref. Fig. 401).

(4) Disconnect electrical connectors from back of audio selector panel and remove panel.


AUDIO SELECTOR PANEL - FLIGHT ENGINEER/SECOND OFFICER
FORWARD ELECTRONIC SERVICE CENTER (FESC) ACCESS DOOR
AUDIO SELECTOR PANEL IN FESC
FLIGHT STATION
VIEW LOOKING AFT AT FLIGHT ENGINEER/SECOND OFFICER POSITION
AUDIO SELECTOR PANEL - OBSERVER
FLIGHT STATION
VIEW LOOKING AFT AT OBSERVER POSITIONS
AUDIO SELECTOR PANEL (TYPICAL 5 PLACES)
AUDIO SELECTOR PANEL - CAPTAIN
AUDIO SELECTOR PANEL - FIRST OFFICER
FLIGHT STATION
VIEW LOOKING FORWARD AT CAPTAIN AND FIRST OFFICER POSITIONS
HH 9999
M1-5100-23-279

R Audio Selector Panel - Removal and Installation
R Figure 401

C. Installation of Audio Selector Panel - Captain, First Officer, Flight Engineer/Second Officer, Observer, or Forward Electronic Service Center.

(1) Verify circuit breakers opened in Steps 2A(1) and 2A(2), or 2B(1) and 2B(2) (as applicable) are open and tagged.

(2) Connect electrical connectors to back of panel (Ref. Fig. 401).

(3) Position panel in mount and secure with half-turn mounting fasteners.

(4) Remove tags and close circuit breakers opened in Steps 2A(1) and 2A(2), or 2B(1) and 2B(2).

(5) Perform portions of audio integrating system operational test applicable to panel which was replaced (Ref. 23-51-00). If Captains, F/O, or FE/SO panel was replaced, perform applicable steps to confirm voice recorder operation (Ref. 23-71-00).

HEADSET STOWAGE AND MICROPHONE SELECTOR CONSOLE ASSEMBLY REMOVAL AND INSTALLATION

1. Referenced Procedure

   23-51-00 Audio Integrating System - Adjustment and Test

2. Removal/Installation

   A. Removal

      (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12), F/O & OBS (A13), and FLT INTPH AMPL (A14).

      On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers AUDIO CONT - CAPT & F/E (C16), F/O & OBS (C17), and FLT INTPH AMPL (C18).

      (2) Remove mounting screws and slide headset stowage and microphone selector console assembly out of mount, (Ref. Fig. 401).

      (3) Disconnect connector and remove assembly.

   B. Installation

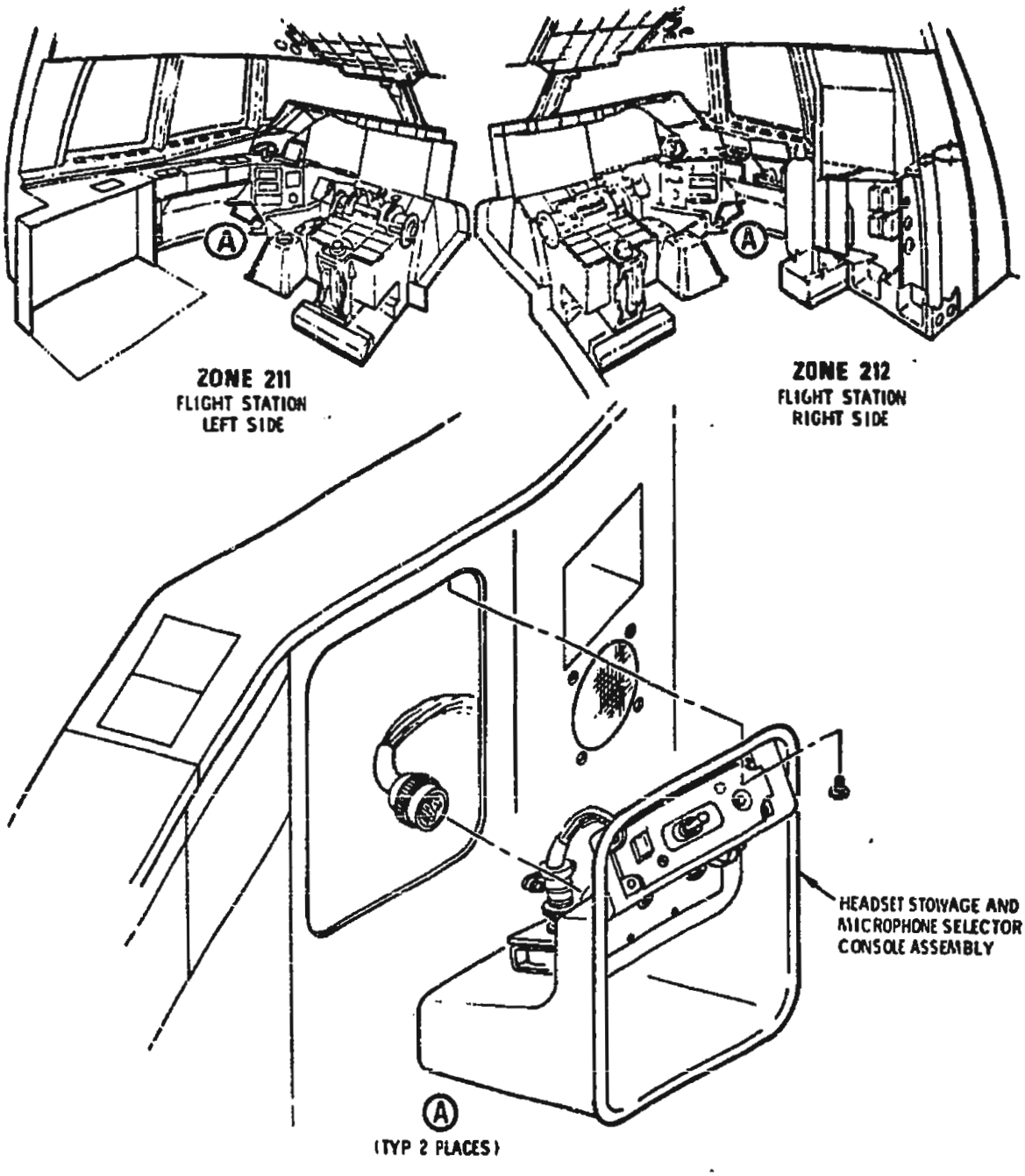
      (1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

      (2) Position headset stowage and microphone selector console assembly at mount and connect electrical connector (Ref. Fig. 401).

      (3) Slide assembly into mount and install mounting screws.

      (4) Remove tags and close circuit breakers opened in Step 2A(1).

      (5) Perform portions of audio integrating system operational test applicable to headset stowage and microphone selector console assembly which was replaced (Ref. 23-51-00).



Headset Stowage and Microphone Selector Console Assembly
Removal and Installation
Figure 401

FLIGHT STATION SPEAKER - REMOVAL AND INSTALLATION

1. Reference Procedures

23-51-00	Audio Integrating System - Adjustment and Test
23-51-09	Headset Stowage and Microphone Selector Console Assembly - Removal and Installation
24-00-00	Electrical Power - Maintenance Practices

2. Removal/Installation

A. Removal (Aircraft 001-031)

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12), F/O & OBS (A13), and FLT INTPH AMPL (A14).

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers - AUDIO CONT -CAPT & F/E (C16), F/O & OBS (C17), and FLT INTPH AMPL (C18).

(2) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).

(3) Disconnect connector on back of flight station speaker (Ref. Fig. 401).

(4) Remove speaker mounting screws. Remove speaker.

A. Removal (Aircraft 032-999)

(1) On pilots overhead CB panel, CB1, open and tag circuit breakers ESSENTIAL COMMUNICATIONS BUS - AUDIO CONTROL - CAPT & F/E (A12), F/O & OBS (A13), and FLT INTPH AMPL (A14).

On FE/SO aft CB panel, CB3, open and tag circuit breakers AUDIO CONT - CAPT & FE (C16), F/O OBS & FESC (C17) and FLT INTPH AMPL (C18)

R (2) Remove six (6) screws and washers securing speaker
R assembly on overhead panel (Ref. Fig. 401).

(3) Carefully remove speaker assembly from panel until harness connector is accessible. Disconnect wire harness from speaker assembly.

R R R (4) Four (4) screws and washers retain speaker unit in support assembly. Remove four (4) screws and washers thereby separating speaker unit from from support assembly.

B. Installation (Aircraft 001-031)

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Install flight station speaker with mounting screws (Ref. Fig. 401).

(3) Connect connector to back of speaker.

(4) Install headset stowage and microphone selector console assembly (Ref. 23-51-09).

(5) Remove tags and close circuit breakers opened in Step 2A(1).

(6) Turn on electrical power (Ref. 24-41-00).

(7) Perform applicable portion of audio integrating system operational test (Ref. 23-51-00).

(8) Turn off electrical power (Ref. 24-41-00).

B. Installation (Aircraft 032-999)

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

R (2) Secure speaker unit in support assembly with four (4) screws and washers (Ref. Fig. 401).

(3) Install wire harness connector on speaker unit.

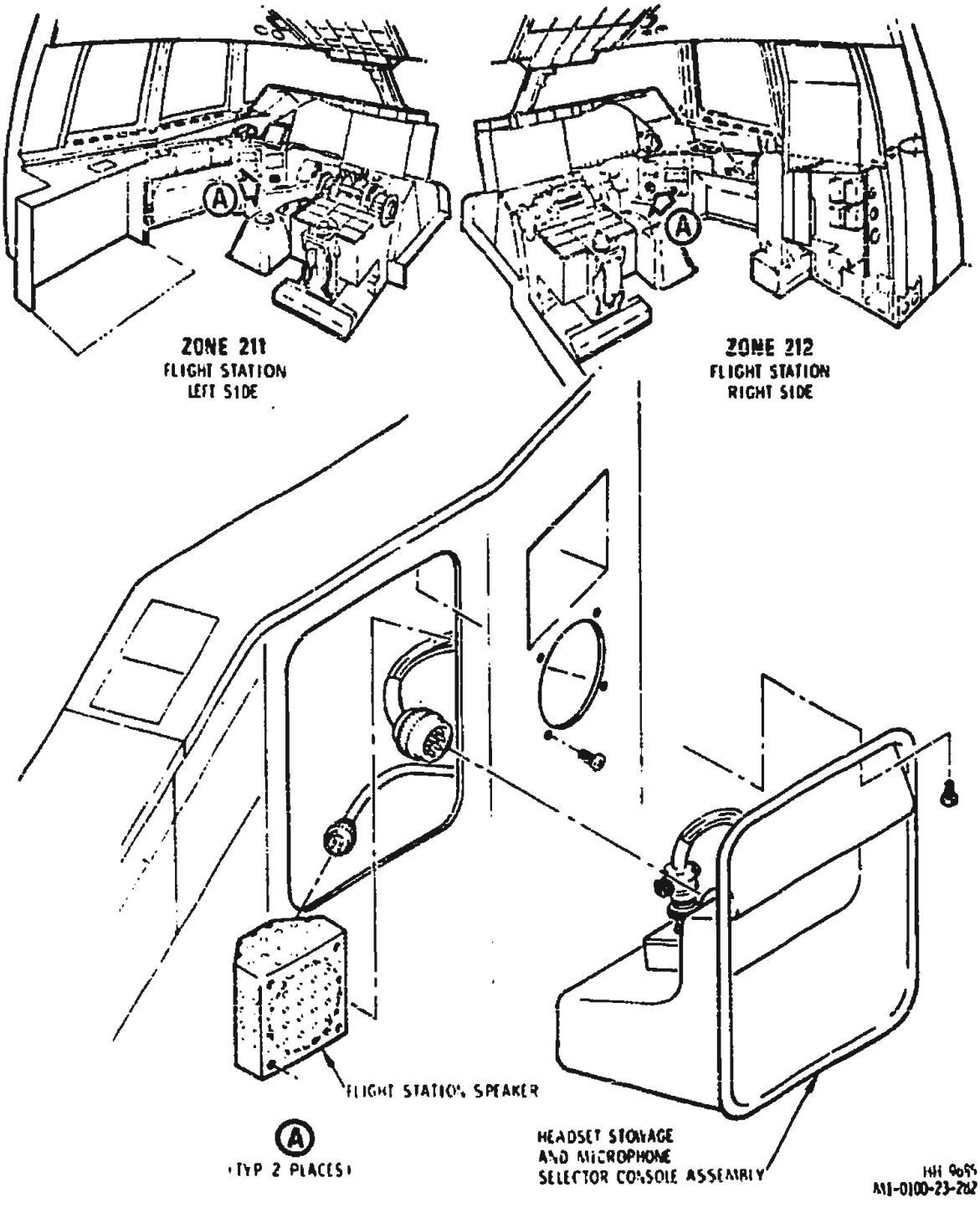
R (4) Carefully position speaker assembly in panel opening and secure in place with six (6) screws and washers.

(5) Remove tags and close circuit breakers opened in Step 2A(1).

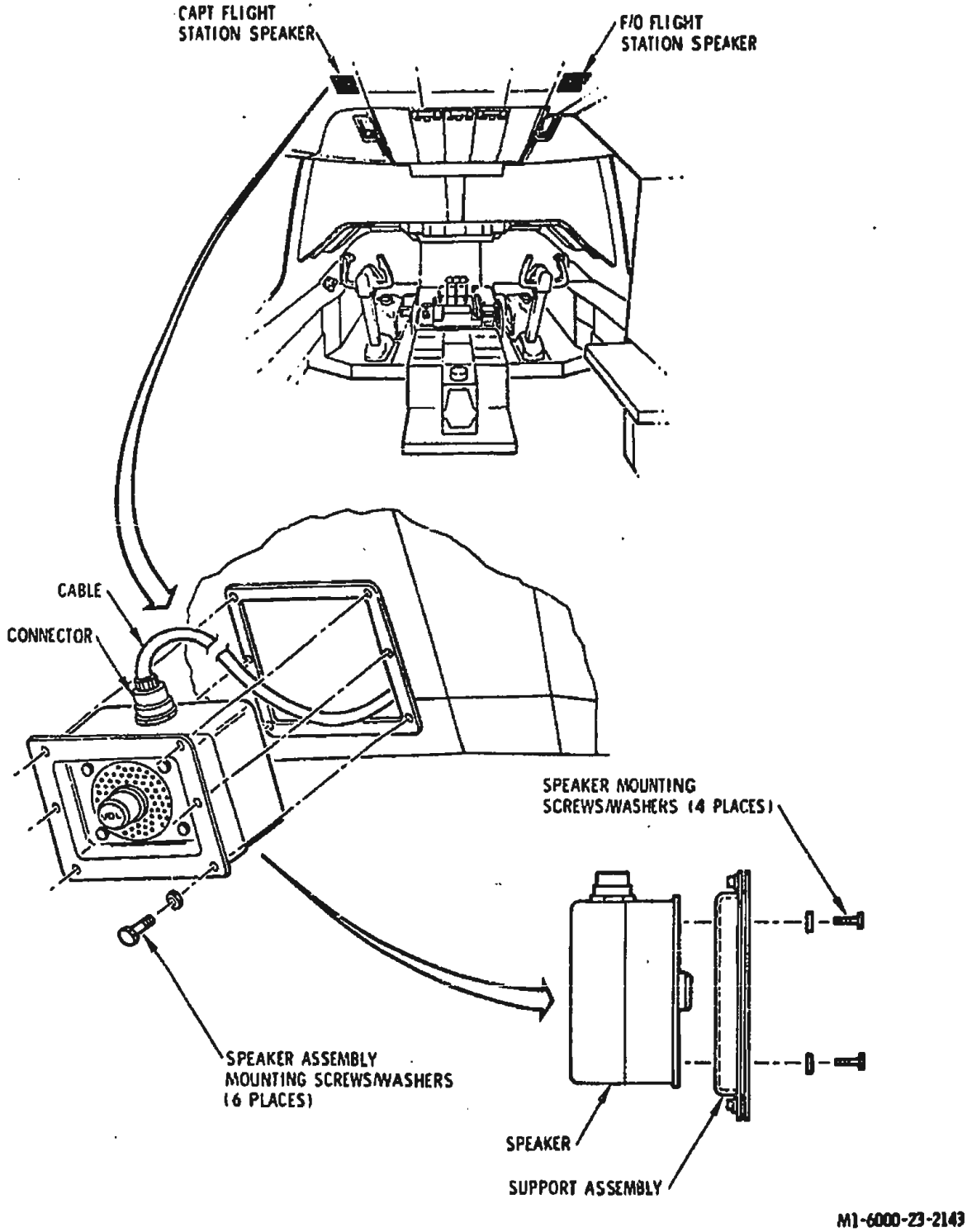
(6) Turn on electrical power (Ref. 24-41-00).

(7) Perform applicable portion of audio integrating system operational test (Ref. 23-51-00).

(8) Turn off electrical power (Ref. 24-51-00).



Flight Station Speaker - Removal and Installation
Figure 401



R Flight Station Speaker - Removal and Installation
R Figure 401

R EFFECTIVITY: 032-999
R
001B

INTERPHONE AMPLIFIER - REMOVAL AND INSTALLATION

1. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ESSENTIAL COMMUNICATIONS
R BUS - FLT INTPH AMPL (A14).

R On Flight Engineer/Second Officers aft circuit breaker
R panel CB3, open and tag circuit breaker FLT INTPH AMPL
R (C18).

R (2) Locate interphone amplifier in forward electronic
R service center, zone 113, rear rack shelf No.1.

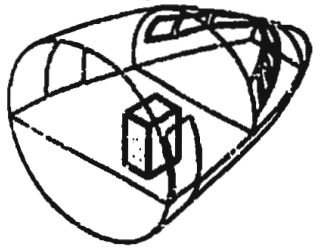
(3) Loosen knurled thumbscrew and disengage from mounting bracket at front of amplifier;remove amplifier (Ref. Fig. 401).

B. Installation

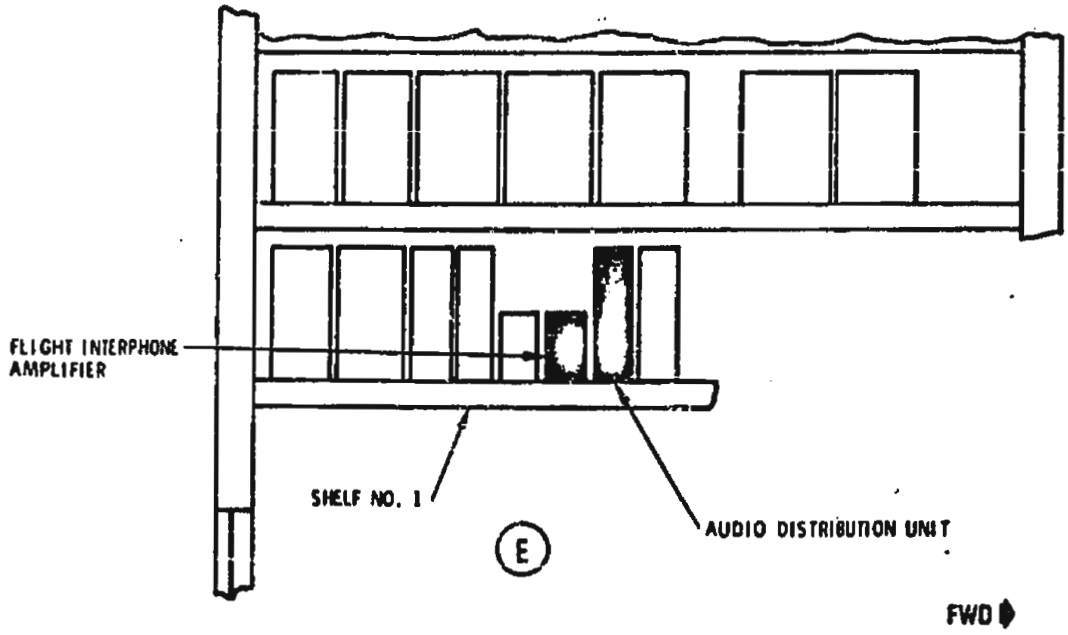
(1) Verify that circuit breaker opened in Step A(1) is open and tagged.

(2) Position amplifier in rack and secure with knurled thumbscrew (Ref. Fig. 401).

(3) Remove tag and close circuit breaker opened in Step A(1).



ZONE 113



FORWARD ELECTRONICS SERVICE CENTER
REAR RACK
VIEW LOOKING FORWARD

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R
R

Interphone Amplifier - Removal and Installation
Figure 401

CR OXYGEN MASK MICROPHONE - OPERATIONAL TEST

CR NOTE: Test of the oxygen mask microphone is conducted as part CR of the audio intergrating system adjustment/test, CR 23-51-00 page 501, paragraph 2. This test of the oxygen CR mask microphones is isolated to preclude a check of the CR entire interphone system when the oxygen mask microphone CR only requires testing.

CR 1. Operational Test

CR A. Turn on electrical power (Reference 24-00-00).

CR B. On pilot's overhead circuit breaker panel CB1, Zone 210, CR verify that circuit breakers ESSENTIAL COMMUNICATIONS CR BUS-AUDIO CONTROL - CAPT & F/E (A12) and F/O & OBS (A13) and CR FLT. INTPH. AMPL (A14) are closed.

CR C. On FE/SO aft circuit breaker panel CB3, Zone 215, verify CR that circuit breakers AUDIO CONTROL - CAPT & F/E (C16), F/O CR & OBS (C17), and FLT INTPH. AMPL (A14) are closed.

CR D. On all flight station audio selector panels, zones 210 and CR 215, depress MIC SEL INT, FLT INT, and SPKR controls, and CR adjust volume as necessary. Select all NORM/ALT switches to CR NORM, and release all VOICE and RANGE controls.

CR E. On the Captain's headset stowage and microphone selector CR console select the OXY/BOOM switch to OXY, and release the CR PA ON OXY switchlight. Depress console PRESS TO TALK switch CR and speak into the oxygen mask microphone. Verify that the CR sidetone is loud and clear.

CR F. Repeat step (E) at the First Officers position.

CR G. At the First Observer's, and then the Second Observer's CR positions, depress PRESS TO TALK switch and speak into the CR oxygen mask microphone. Verify that the sidetone is loud CR and clear.

CR H. At the Flt Engineer's position, select the FE/SO OXY/BOOM CR switch to OXY. Depress PRESS TO TALK switch and speak into CR oxygen mask microphone. Verify that the sidetone audio is CR loud and clear.

CR I. Release all audio selector panel controls. Stow all oxygen CR masks. Turn off aircraft power if no longer required.

STATIC DISCHARGING SYSTEM - DESCRIPTION AND OPERATION

1. General

Static dischargers are attached to the aircraft outer skin surface to prevent radio noise. The dischargers also act as lightning diverters by conducting high lightning currents through their base to the aircraft structure.

Dischargers are located at 44 points on the wingtip and empennage areas (Ref. Fig. 1). Two types of discharger installations are used (tip and trailing edge) to position the static dischargers at aircraft extremities where both RF coupling and corona-producing dc fields are high.

Each wingtip installation has three tip dischargers and seven trailing edge dischargers. Six of the trailing edge dischargers are attached to the aileron control surface.

The vertical stabilizer installation has three tip dischargers and seven trailing edge dischargers. With the exception of two tip dischargers, all dischargers are attached to the rudder control surface.

R Each horizontal stabilizer installation has two tip dischargers
R and five trailing edge dischargers. One of the tip dischargers
R is attached to the horizontal stabilizer and the other one is
R attached to the elevator. The trailing edge dischargers are
R attached to the elevator control surface.

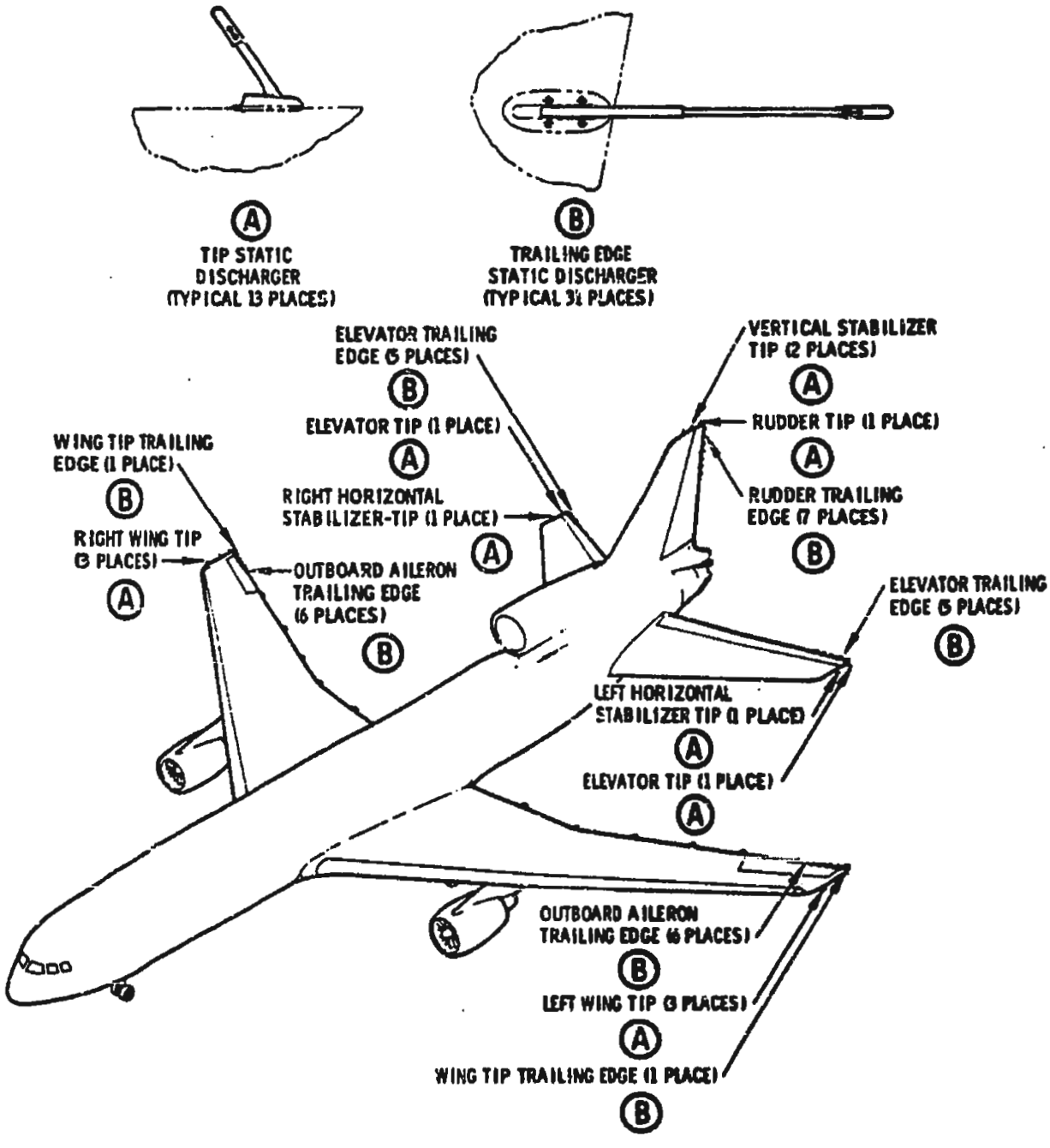
2. Operation

Precipitation static (caused by the aircraft striking charged air and moisture particles) and jet engine exhaust ionization cause static electricity to accumulate on the aircraft surface. When a static charge builds up, the static dischargers create a corona at the decoupled discharger rather than the aircraft points which are coupled to the antenna. The decoupling effect of the null field static dischargers reduces noise interference in communication and navigation equipment.

3. Static Discharger

A. Description

Two types of null-field, resistive-type static dischargers are used on the aircraft. The two types are similar in construction, and they operate in the same manner.



R Static Discharging System Equipment Location
R Figure 1

EFFECTIVITY: ALL

001B

The difference between the two types of dischargers is in their shapes. The tip discharger has a sweep radius in its protruding section to allow it to trail in the airstream. The trailing edge discharger has a straight protruding section which also trails in the airstream.

Each discharger consists of two main sections, which are an aluminum retainer mounting plate and a discharger tube. The retainer mount is riveted to the aircraft structure. The discharger is comprised of a molded nylon rod with a resistive element core. This core is electrically bonded to a pointed discharger tungsten pin at the tip and to an aluminum fitting at the base. A yellow-painted nylon molded pin guard is cemented to the rod tip to protect the tip from damage. The discharger fits into a machine-slotted cavity in the retainer mount, and is held in place by a set screw.

STATIC DISCHARGING SYSTEM - INSPECTION AND CHECK

1. Referenced Procedure

   23-61-01 Static Discharger - Removal and Installation

2. Equipment and Materials

   Megohmmeter - General Radio Type 1862C, or equivalent

3. Inspection/Check

   A. Inspection

      (1) Verify that all static dischargers are secure on their mounting bases (Ref. Fig. 601).

      (2) Replace all broken or missing dischargers (Ref. 23-61-01).

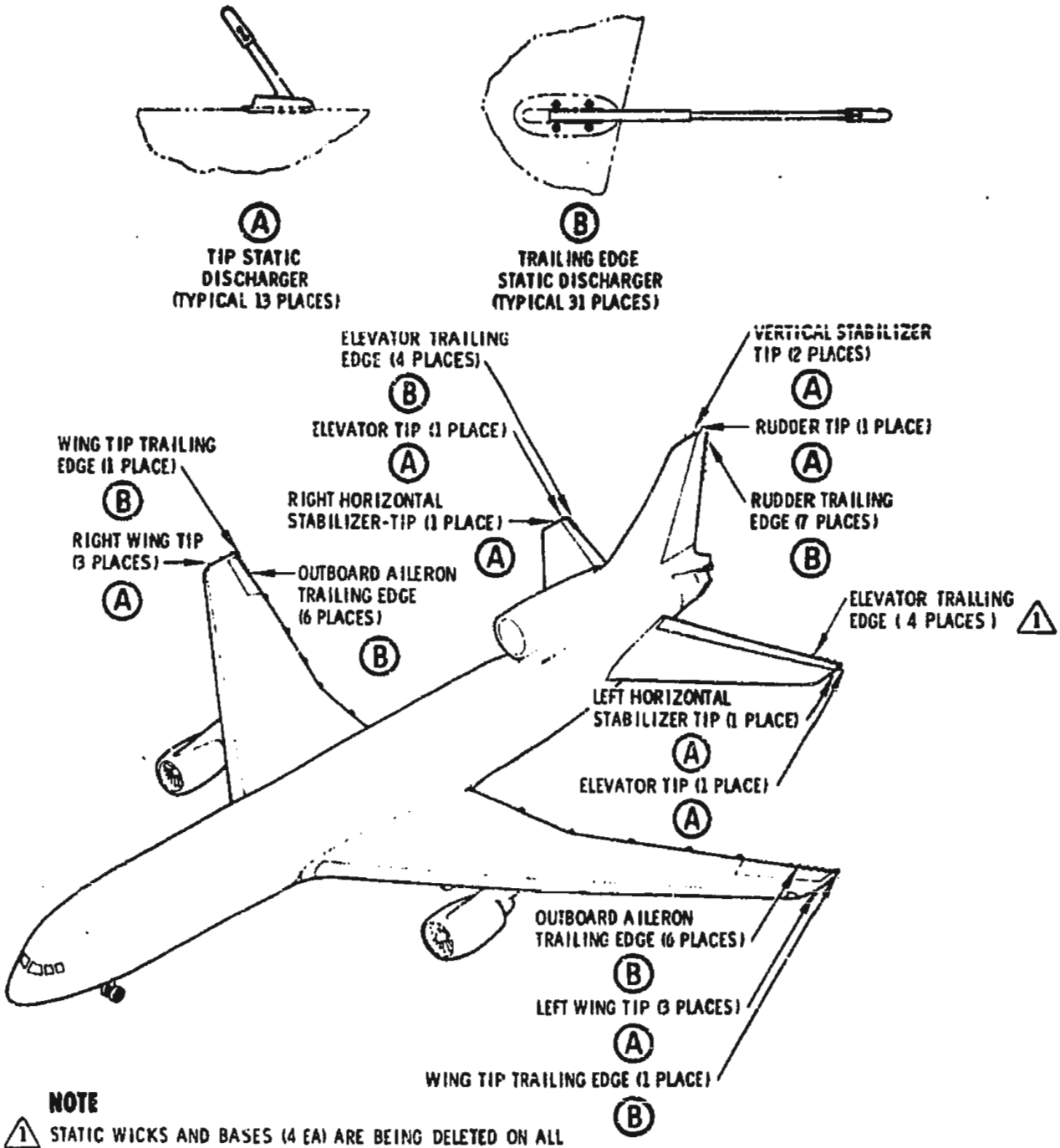
CR NOTE: Granger static dischargers have plastic extrusions on either side of the discharge pin. These extrusions are personnel guards only and perform no function in discharger operation. Do not replace dischargers for missing personnel guards only.

      (3) Check dischargers for lightning damage as evidence by burned, roughened, or pitted rods or discharge retainers.

NOTE: A discharger struck by lightning may be retained in service if it meets the resistance tolerances in Step 3A(5) and the discharger pin tips are straight and sharp.

      (4) Check for missing, bent, blunted, or broken discharger pins. Replace dischargers that have defective pins (Ref. 23-61-01).

      (5) Measure resistance of all dischargers between the discharger pin and aircraft structure with a megohmmeter. Verify that wing, elevator, and rudder trailing edge dischargers measure 8 to 100 megohms. Verify that wing tip, elevator tip, horizontal stabilizer tips, and rudder tip dischargers measure 5 to 60 megohms. Replace dischargers that measure out-of-tolerance (Ref. 23-61-01).



NOTE

1 STATIC WICKS AND BASES (4 EA) ARE BEING DELETED ON ALL NEW FABRICATED TRAILING EDGE WEDGES.

M1-0000-23-3803

CR
CR

Location of Static Dischargers
Figure 601

EFFECTIVITY: ALL

001B

STATIC DISCHARGER - REMOVAL AND INSTALLATION

1. Equipment and Materials

Wrench, 8B HUNTER 076, or equivalent

Megohmmeter, General Radio Type 1862C, or equivalent

2. Removal/Installation

A. Removal

C NOTE: Granger static dischargers have plastic extrusions on
C either side of the discharge pin. These extrusions
C are personnel guards only and perform no function in
C discharger operation. Do not replace dischargers for
C missing personnel guards only.

(1) Use workstand to gain access to discharger to be removed.

(2) Loosen set screw in base retainer with wrench and remove rod-shaped discharger.

B. Installation

(1) Fit discharger rod into aluminum base retainer.

CAUTION: DO NOT BLUNT OR BEND PIN IN DISCHARGER ROD DURING INSTALLATION. DISCHARGER WILL NOT FUNCTION PROPERLY WHEN PIN IS DAMAGED.

(2) Hold discharger firmly in place and tighten screw with wrench.

(3) Verify that discharger base retainer is securely attached to aircraft surface.

R (4) Measure resistance of installed discharger between
R discharger pin and aircraft surface with megohmmeter.
R Trailing edge dischargers on wings, elevators, and
R rudder should measure 8 to 100 megohms. Tip
R dischargers on wings, elevators horizontal stabilizers, and rudder should measure 5 to 60 megohms.

COCKPIT VOICE RECORDER SYSTEM(CVR) - DESCRIPTION AND OPERATION

1. General

The Cockpit voice recorder system records flight station area audio (conversation); and the Captains, First Officers, and Flight Engineer/Second Officers (FE/SO) communication, navigation, and interphone audio.

The CVR system (Ref. Fig. 1) includes the following components:

A control panel on the pilots overhead panel in the flight station, zone 210

R On aircraft 001-024 and 027, a CVR in the aft electronic equipment area, zone 164

R On aircraft 025, 026, and 028-999, a CVR with an underwater locating device (ULD) installed on
R the front panel, in the aft electronic equipment area, zone 164

Power for the CVR system is provided by the ac essential radio bus.

2. Operation

The CVR system (Ref. Fig. 2) makes separate magnetic tape records of all sounds picked up by the control panel area microphone (flight station), and all audio signals processed by the audio selector panels at the Captains, First Officers, and FE/SO positions (Ref. 23-51-00).

Audio from each of the four signal sources is recorded on a separate track of a one-half hour continuous-loop (endless) tape. The tape moves from the tape reel across the continuous erase head, the record head, the monitor (playback) head, and back onto the tape reel. In approximately one-half hour the entire tape loop moves past the heads and returns to the reel. This causes all audio recorded during the last one-half hour of operation to be retained on the tape.

The entire tape can be erased (in bulk) by depressing the ERASE switch on the control panel. The erase circuit is completed only when the aircraft is on the ground and parked. The ERASE switch is wired in series with the parking brake switch circuit (Ref. 32-48-00) and the air/ground sensing circuit (Ref. 32-63-00).

R The control unit contains a TEST switch and a go, no-go indicator to determine if the CVR equipment is serviceable before flight. A go, no-go indicator and test switches are also installed on the recorder front panel. Both the recorder and control panel test switches activate a sine wave generator which produces a 600-Hz test tone to test each recorder channel. A monitor circuit picks up the test tone and uses the signals to provide go, no-go indications and an audio tone at headset jacks located on the control panel and the front of the recorder unit.

NOTE: The MONITOR - 600 OHMS headset jack on the recorder front panel is deactivated (disconnected).

R The CVR system is energized whenever power is available on the essential ac radio bus, and the VOICE RECORD circuit breaker is closed. An 18V dc output from the recorder supplies power to operate a microphone preamplifier in the control panel. All audio signals processed by the Captains, First Officers, or R FE/SO audio selector panels are connected to the CVR unit. The audio signals are recorded as follows:

FE/SO audio selector panel output on tape channel 1

First Officers audio selector panel output on tape channel 2

Captains audio selector panel output on tape channel 3

Flight station conversation picked up by the control panel area microphone is amplified in the control panel and then recorded on tape channel 4.

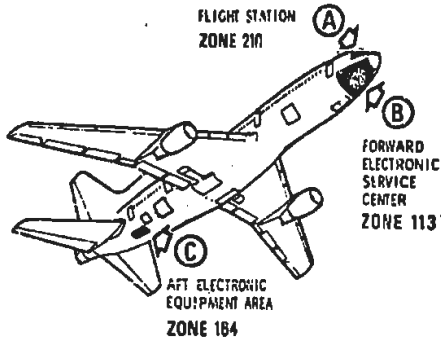
When the control panel ERASE switch is depressed and held, 18V R dc is applied to the CVR bulk-erase circuit through the parking brake switch circuit (in the set position) and air/ground sensing relay No. 4 (in the ground position). After a delay of 2 seconds, the erase coil energizes and erases the audio from all four tape channels on the entire tape.

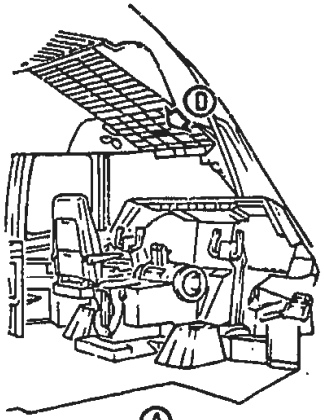
When the control panel TEST switch is depressed, a ground return R is applied to the CVR to activate the test tone circuit. The test tone signal is recorded on each tape track in sequence and then played back through the monitor head circuit. The monitor head circuit feeds signals to the indicators in the recorder and control panel for go, no-go indications.

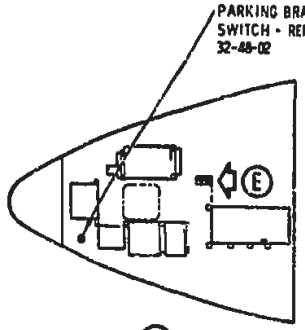
R 3. Cockpit Voice Recorder

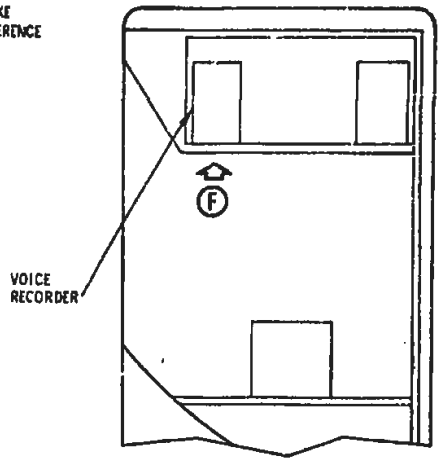
A. Description

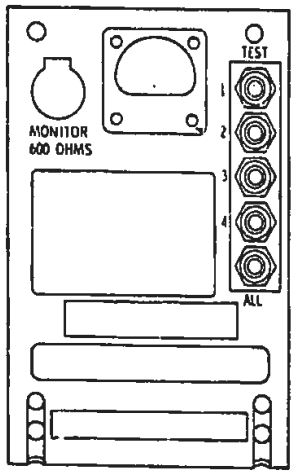
R The cockpit voice recorder is a rack-mounted unit housed in an international-orange painted case. The recorder consists

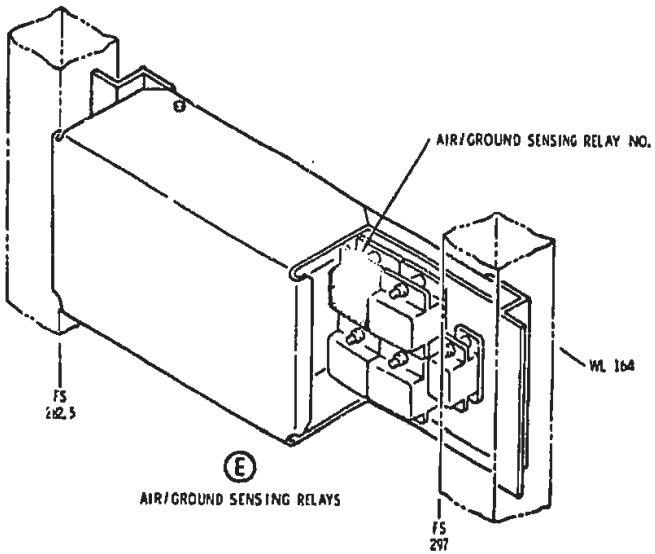


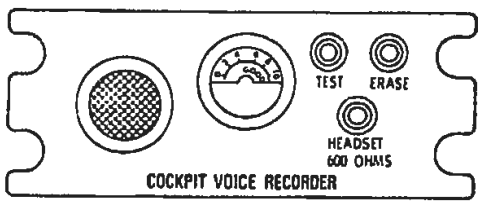












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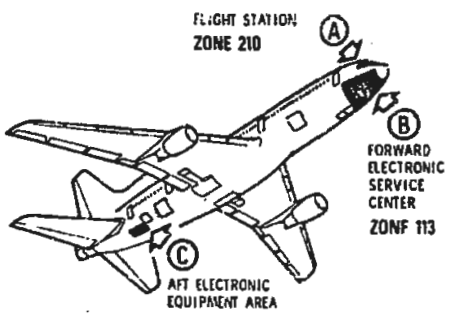
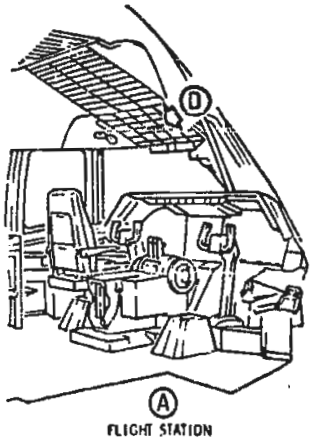
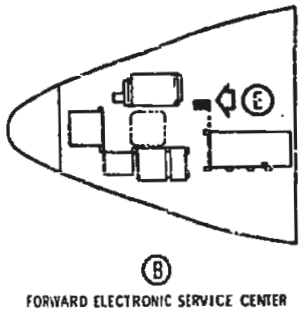
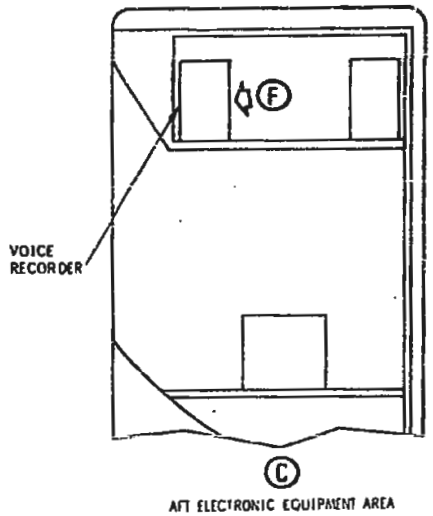
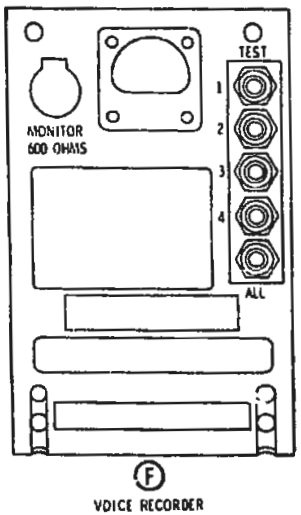
R R Cockpit Voice Recorder System Equipment and Location
Figure 1

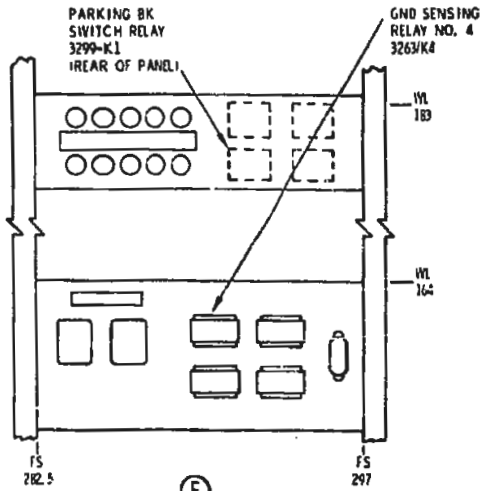


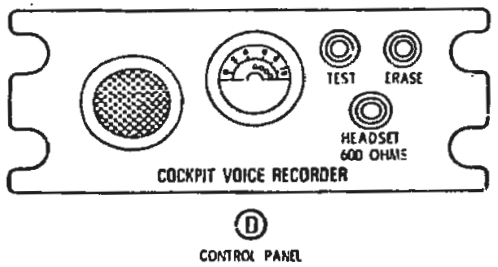












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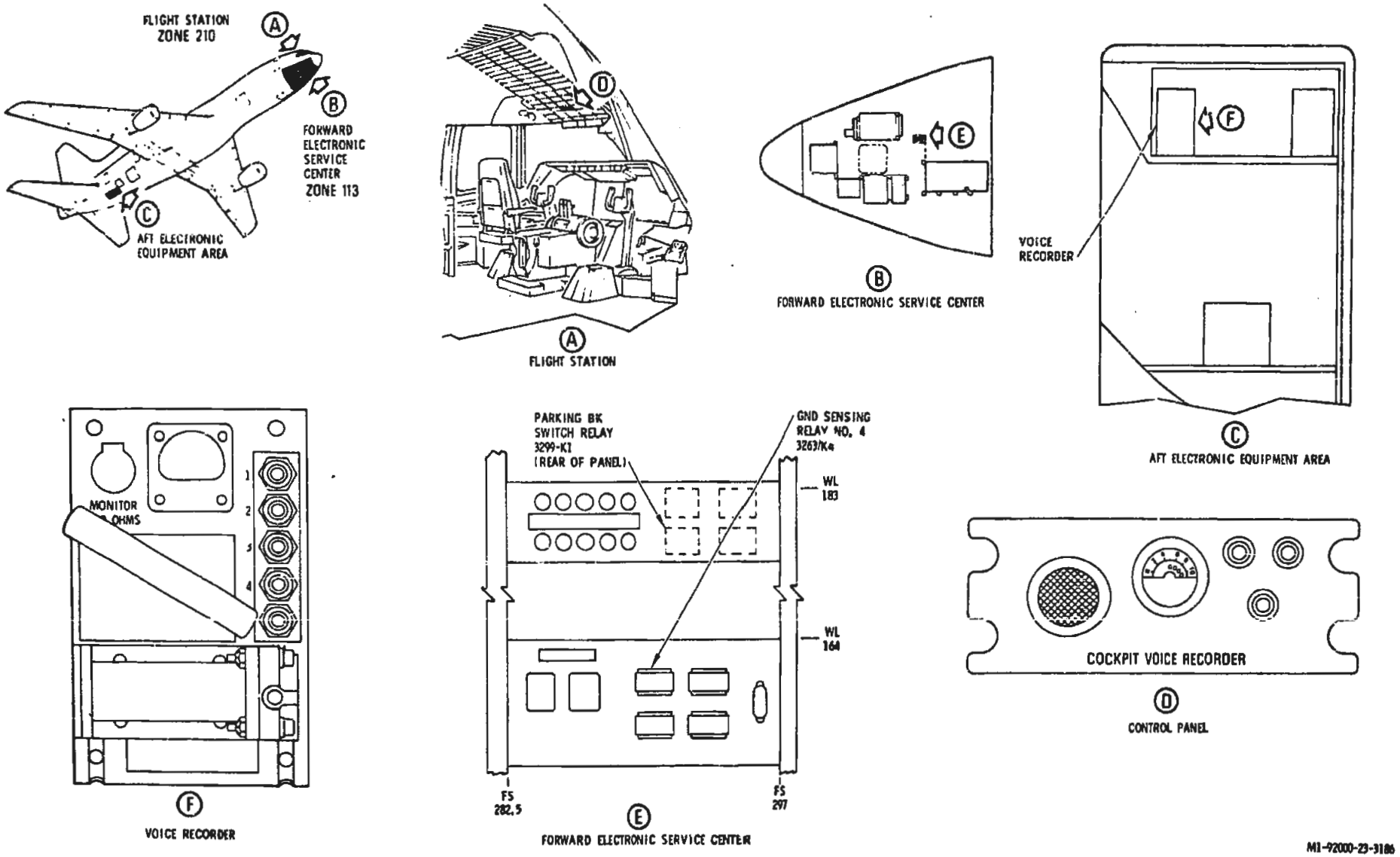
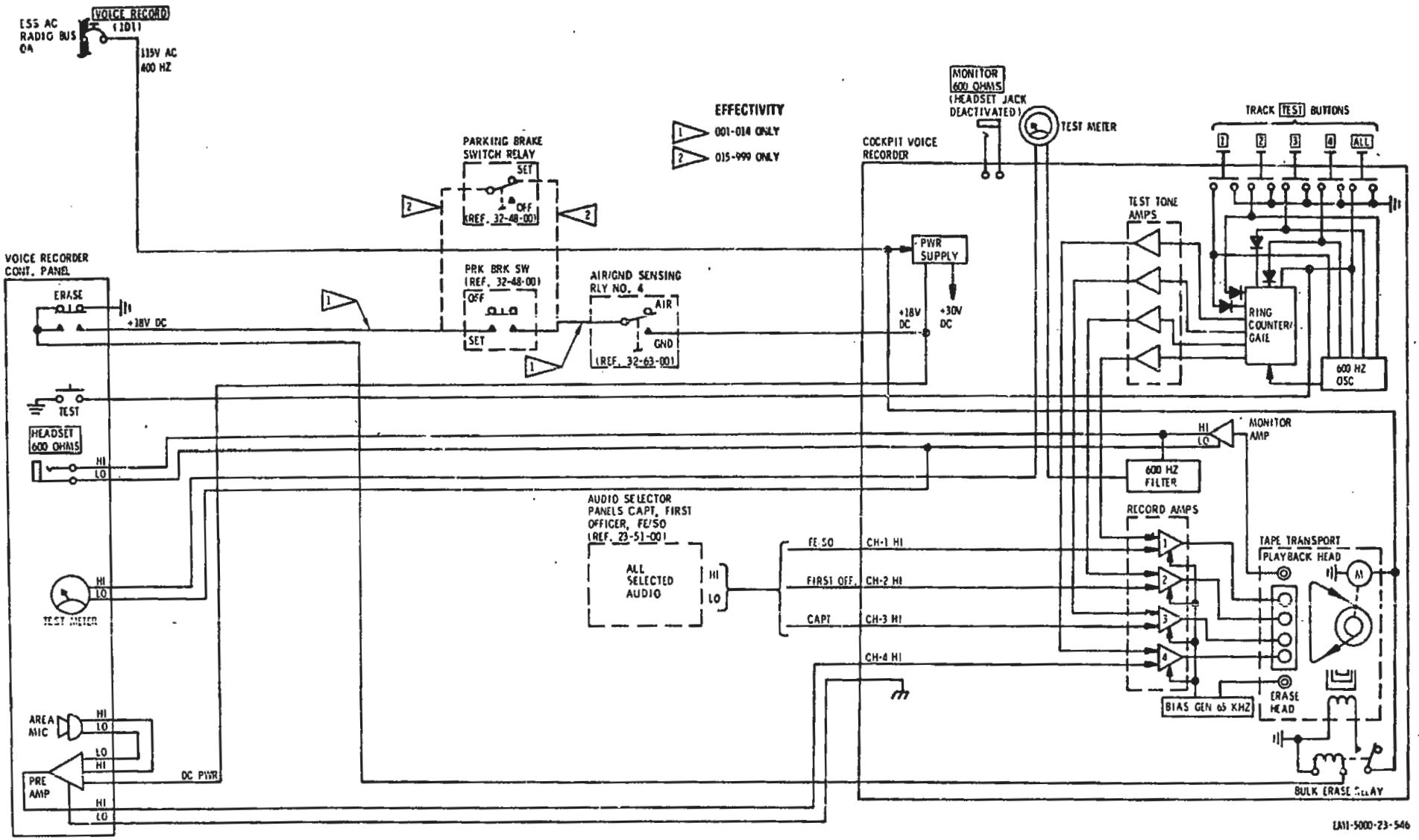
R Cockpit Voice Recorder System Equipment and Location
R Figure 1



Cockpit Voice Recorder System-Equipment and Location
Figure 1



Cockpit Voice Recorder System Block Diagram
Figure 2

EFFECTIVITY: ALL

001B

of a drive unit, a reel and tape, a reel cover, circuit board assemblies, and an insulation assembly.

(1) Drive Unit

The drive unit contains the following:

(a) A bridge assembly consisting of the recording, monitor, and continuous-erase heads

(b) A capstan assembly which controls the rate of movement of the tape

(c) A chute assembly which guides the tape into the reel and tape assembly

(2) Reel and Tape

The reel and tape consists of an endless loop of magnetic tape 0.250 inch wide by 0.0014 inch thick (nominal) by 308 feet long wound on a single-sided (one plate) reel. The tape is oxide-coated on one side and graphite-lubricated on the other.

(3) Reel Cover

The reel cover consists of a roller guide system made up of five tape compacting rollers and attaching hardware, and a housing cover.

(4) Circuit Board Assemblies

The electronic circuit board assemblies include four single-stage amplifier cards, a bias generator card, a power supply card, a monitor amplifier card, a test circuit card, and a bulk-erase timing card. Color-coded test points and adjustments are located on the cards to facilitate testing and fault isolation.

(5) Insulation Assembly

An insulation assembly encloses the drive unit assembly to protect it from shock and thermal damage. The insulator is made from an inert mineral fibrous mass that is shaped to surround the assembly. Around this material is a plastic cover which acts as a waterproof barrier. The insulating components are partially saturated with water. When the plastic cover is exposed to extreme heat, the cover melts and exposes the water-saturated insulation. Low-temperature melt plugs in the outer reel case allow generated steam to vent to atmosphere to provide an isothermal barrier

between the external high temperature and the enclosed tape module.

The recorder front panel has five TEST switches, an indicator, and a headset jack which are used for test functions as follows:

NOTE: The MONITOR - 600 OHMS headset jack on the recorder front panel is deactivated (disconnected).

TEST Switches

The TEST switches, placarded 1, 2, 3, 4, and ALL, are used in conjunction with the indicators and headset jacks. The switches are used to test the recording channel by recording a test tone on the tape for playback through the monitor circuit. When a channel pushbutton (1, 2, 3, or 4) is pressed, only the corresponding recorder channel operates. When the ALL channels pushbutton is pressed, all four channels operate in sequence. The test circuit function continues until the pushbutton is released.

Indicator

The indicator is used in conjunction with the TEST switches. The indicator has a divided dial to indicate a go, no-go circuit condition. This indicator, which is identical to the control panel indicator, is connected to convey the same information. A go condition is indicated when the indicator pointer deflects into the green-shaded right half of the dial (placarded GO). A no-go condition is indicated when the pointer does not deflect past the red-shaded left half of the dial.

NOTE: With recorder TEST - ALL (or control panel TEST) switch depressed, indicator needle will oscillate as recorder test circuit sequences from track to track. Indication is good (go) if needle deflects into green area.

MONITOR - 600 OHMS Headset Jack

The MONITOR - 600 OHMS headset jack on the recorder front panel is deactivated (disconnected).

B. Operation

R The CVR unit operates on 115V, 400-Hz, single-phase power. With power applied to the unit, the drive motor energizes and turns the capstan drive through a pully/belt arrangement. The capstan drive regulates and drives the tape at a constant rate of 1-7/8 inches per second. The continuous-loop (endless) tape is fed past the continuous-erase head, and previous signals are erased. The tape moves past the record head and the monitor head, then back to the capstan drive to complete the loop. Audio signals from the audio selector panels and area microphone are fed through the record amplifiers to the record head. The recorded signals are picked up by the monitor head and amplified. The monitor amplifier output is connected to the 600-ohm headset jack on the control panel.

When the TEST - ALL switch on the recorder front panel (or the TEST switch on the control panel) is depressed, the 600-Hz test tone generator and the ring counter/gate are activated. The test tone is gated to each record amplifier in a repeating sequence of 1, 2, 3, 4. Each channel receives the test tone for 0.8 seconds during each sequence. The test tone is recorded on the corresponding tape tracks, and is then picked up by the monitor head and amplified by the monitor amplifier. The amplified test tone signals are fed to the headset jack, and through a 600-Hz filter to the recorder and control panel go, no-go indicators. Depressing the TEST - 1, 2, 3, or 4 switch causes the ring counter/gate to switch to the corresponding channel, which then records the test tone continuously. The test circuits remain activated until the TEST switch is released. Test circuit activation does not interrupt voice recording on any channel.

When the control panel ERASE switch is depressed (aircraft on ground, parking brakes set), the bulk-erase circuit is activated. An interlock circuit applies 115V, 400 Hz ac power to the erase coil/capacitor circuit for approximately five seconds, which is the time required for the tape reel to make one complete revolution.

4. Control Panel

A. Description and Operation

The control panel provides remote test, monitor, and erase functions for the voice recorder system. The major components of the panel are:

An area microphone

An area microphone preamplifier

An ERASE switch

A TEST switch

A go, no-go indicator

A HEADSET - 600 OHMS jack

Area microphone audio signals are connected through the preamplifier to the voice recorder. The preamplifier raises the microphone output to a level suitable for recorder input.

The TEST pushbutton function is the same as the TEST - ALL switch on the recorder unit.

The ERASE switch operates the bulk-erase circuit in the recorder through the parking brake circuit (Ref. 32-48-00) and the air/ground sensing circuit (Ref. 32-63-00).

The go, no-go indicator, which is identical to the recorder unit indicator, operates with the TEST pushbutton and provides a go, no-go indication.

The HEADSET - 600 OHMS jack provides a point to monitor the audio recorded on the tape.

R 5. Underwater Locating Device (Aircraft 025, 026, 028-999)

A. Description

The underwater locating device (ULD) is attached to the front panel of the CVR installed in the aft electronic equipment area, zone 164. The ULD is a self-contained battery-powered unit enclosed in a high impact casing. When in operation the device emits a continuous series of ultrasonic pulses providing underwater search teams with a sonar-type signal that indicates the location of a submerged CVR.

B. Operation

Operation of the device is automatically initiated when the device is submerged. The transmitted omnidirectional signal pulses are propagated through the water up to a distance of 1 mile.

R # COCKPIT VOICE RECORDER SYSTEM (CVR) - FAULT ISOLATION

R 1. General

R The diagrams and schematics in this section can be used for fault isolation any time a fault is reported or suspected. The PREREQUISITES listed at the top of each fault isolation diagram must be satisfied prior to starting fault isolation. Uncommon abbreviations are defined on the using fault code diagram or schematic.

R If the flight crew reports a trouble using a fault code number, the code number can be found in the Fault Isolation Reference Table in the Chapter 23 Fault Code Index. The index specifies the exact maintenance manual section, fault isolation diagram, and block number on the diagram where the fault isolation procedure should start. Schematics are included at the end of the section to supplement the fault code diagrams or as an aid in isolating a problem not covered on the diagrams.

R Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 lists the fault isolation diagrams and schematics in this section.

R TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
SCHEM 1	Cockpit Voice Recorder System Electrical Schematic

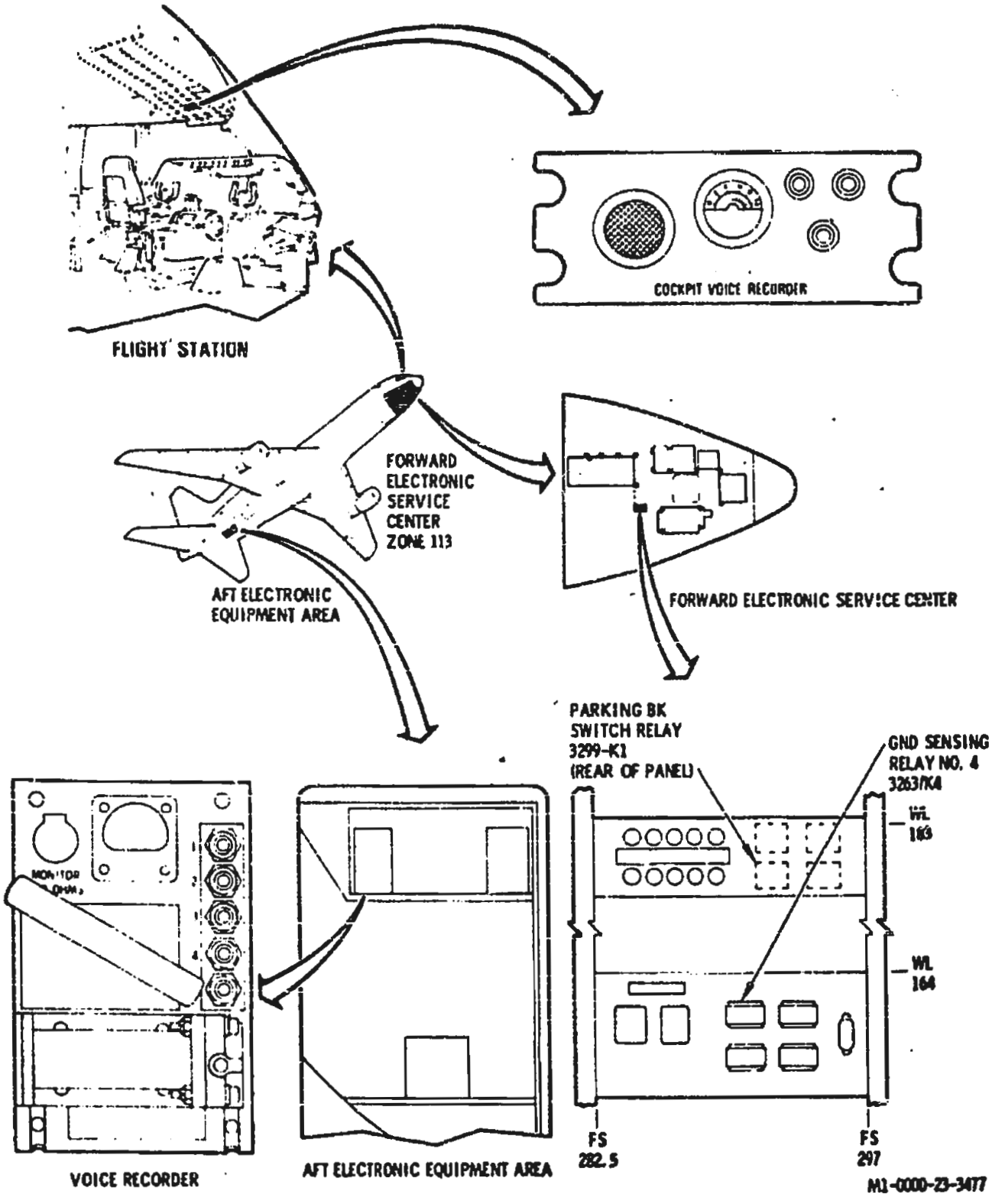
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKER – NO. 1 NAVIGATION VOICE RECORD	1	PILOTS OVHD CB PANEL CB1	20-24-05
CONTROL PANEL – COCKPIT VOICE RECORDER	1	PILOTS OVHD PANEL	23-71-02
PANEL – AUDIO SELECTOR			
CAPTAIN	1	PILOTS CENTER CONSOLE	23-51-04
FIRST OFFICER	1	PILOTS CENTER CONSOLE	23-51-04
FE/SO	1	FE/SO AUXILIARY PANEL	23-51-04
RECORDER – COCKPIT VOICE	1	AFT ELECTRONIC EQUIPMENT AREA, 164 AZ	23-71-01
RELAY – AIR GROUND SENSING NO. 4	1	FESC; 112AB, 211CB	32-63-01
RELAY – PARKING BRAKE SWITCH	1	FESC; 112AB, 211CB	32-48-02

*SEE WM EQUIPMENT LIST

M1-0000-23-3479

R
R Component Location Index
Figure 101

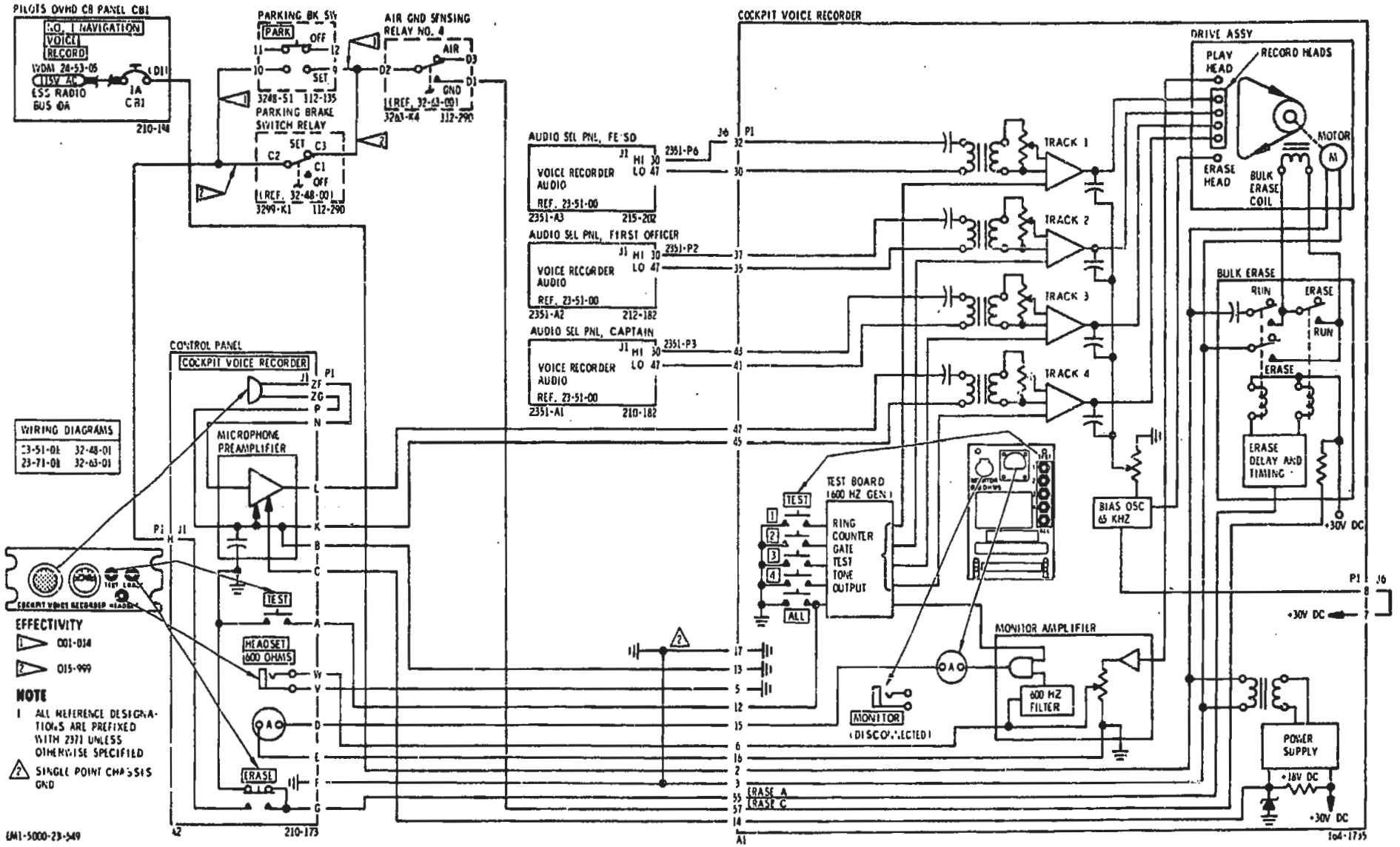
R EFFECTIVITY: ALL
R
001B



R R Component Locator Diagram
Figure 102

EFFECTIVITY: ALL

001B



Cockpit Voice Recorder System Electrical Schematic
SCHEM 1

EFFECTIVITY: ALL

001B

COCKPIT VOICE RECORDER SYSTEM (CVR) - ADJUSTMENT AND TEST

1. Referenced Procedures

10-10-00	Parking - Maintenance Practices
23-51-00	Audio Integrating System - Adjustment and Test
24-00-00	Electrical Power - Maintenance Practices
32-48-00	Parking Brake System - Description and Operation
32-63-00	Air/Ground Sensing System - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Place chocks under main landing gear wheels (Ref. 10-10-00).

(2) Turn on electrical power (Ref. 24-00-00).

(3) Verify that audio integrating system is on (Ref. 23-51-00).

(4) Verify that the following circuit breakers are closed:

On pilots overhead circuit breaker panel CB1, zone 210

NO. 1 NAVIGATION - VOICE RECORD (D1)

LANDING GEAR - PROX SW PWR - NO. 1 (L10) and NO. 4 (L11)

On Flight Engineer/Second Officer (FE/SO) overhead circuit breaker panel CB2, zone 215

GROUND SERVICE - MLG GND SENSE (L8)

On aircraft 015-999 only,
BRAKE - PARKING BRAKE NO. 2 (G22)

R R (5) On pilots overhead panel, zone 210, verify that MASTER RADIO - ESSENTIAL switchlight is depressed.

R R (6) On pilots overhead panel, zone 210, plug headset into HEADSET - 600 OHMS jack on CVR control panel.

(7) On CVR control panel, depress TEST switch and hold for 5 seconds. Verify the following:

(a) 600-Hz tone (test frequency) is heard in headset alternately with no tone (test tone is automatically sequence-switched through voice recorder channels 1 through 4).

(b) Meter on CVR control panel indicates in green (go position) each time 600-Hz tone is heard in the headset.

(8) Verify that parking brakes are set (Ref. 32-48-00), and that air/ground sensing system is in ground condition (weight on wheels - Ref. 32-63-00).

(9) On CVR control panel, depress and hold ERASE switch for 3 seconds.

NOTE: ERASE mode operates only when parking brake is set (Ref. 32-48-00) and air/ground sensing relay No. 4 is closed (aircraft on ground).

(10) Verify that 400-Hz tone is heard in headset during bulk erase mode, and that tone lasts from 5 to 10 seconds before cutoff.

WARNING: LANDING GEAR, SPOILERS, CABIN OUTFLOW VALVES, AND RAM AIR TURBINE MUST BE RENDERED SAFE BEFORE SIMULATING AIRBORNE CONDITION (REF. 32-63-00).

CAUTION: VERIFY THAT MAIN LANDING GEAR WHEELS ARE CHOCKED BEFORE RELEASING PARKING BRAKES.

CR CR (11) Simulate airborne condition by pulling MLG ground sense curcuit breaker CB2-L8.

(12) On CVR control panel, depress and hold ERASE switch for 3 seconds.

(13) Verify that 400 Hz erase tone is not heard in headset.

(14) Return air/ground sensing circuit to ground condition.

(15) Release parking brakes.

(16) Depress and hold ERASE switch for 3 seconds.

(17) Verify that 400 Hz erase tone is not heard in headset.

(18) Set parking brakes.

(19) Speak in normal voice in flight station and verify that intelligible audio is heard in headset after 1/2-second time delay.

R (20) On Captains audio selector panel, depress MIC SEL - INT and FLT INT audio selector.

(a) Verify FLT INT switch on F/O and FE/SO audio selector panels are off.

(b) Completely cover area microphone on CVR control panel with palm of hand.

(c) Key and speak into Captains hand-held microphone.

(d) Verify that intelligible audio is heard in headset (CVR control panel HEADSET jack) after approximately one-half second delay.

NOTE: Area microphone is very sensitive - it must be completely covered to prevent recording on track 4 of message spoken into hand-held microphones.

R (21) Repeat Step (20) using First Officers and FE/SO hand-held microphones.

(22) Remove headset from CVR control panel HEADSET jack.

(23) Turn off electrical power (Ref. 24-00-00).

COCKPIT VOICE RECORDER (CVR) - REMOVAL AND INSTALLATION

1. Referenced Procedures

	20-23-01	Electronic Equipment Rack Front Holddown Extractor - Maintenance Practices
R	23-71-00	Cockpit Voice Recorder System - Adjustment and Test
	23-71-03	Underwater Locating Device (ULD) - Removal and Installation

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker NO. 1 NAVIGATION - VOICE RECORD (D1).

(2) In aft cargo compartment, open door 164AZ to aft electronics equipment area (AEEA). Locate CVR (Ref. Fig. 401) on equipment rack shelf No. 2, zone 164.

(3) Loosen knurled thumbscrews and disengage from mounting brackets at front of recorder (Ref. 20-23-01).

(4) Pull recorder forward until rear connector disengages.

(5) Remove CVR.

CR CR (6) Remove underwater locating device from recorder and hold for installation on new recorder (Ref. 23-71-03).

B. Installation

CR CR CR CR CR (1) Install underwater locating device (ULD) removed from old recorder by sliding ULD through left side of bracket and seat it firmly. Turn ULD so that battery expiration date is visible from front of CVR and install cover plate.

R (2) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

R (3) Position CVR at aft electronics equipment area (AEEA) equipment rack shelf No. 2, zone 164 (Ref. Fig. 401).

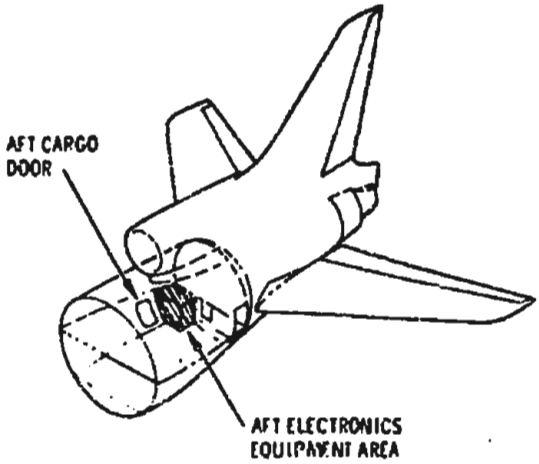
R (4) Slide recorder into rack until connectors engage.

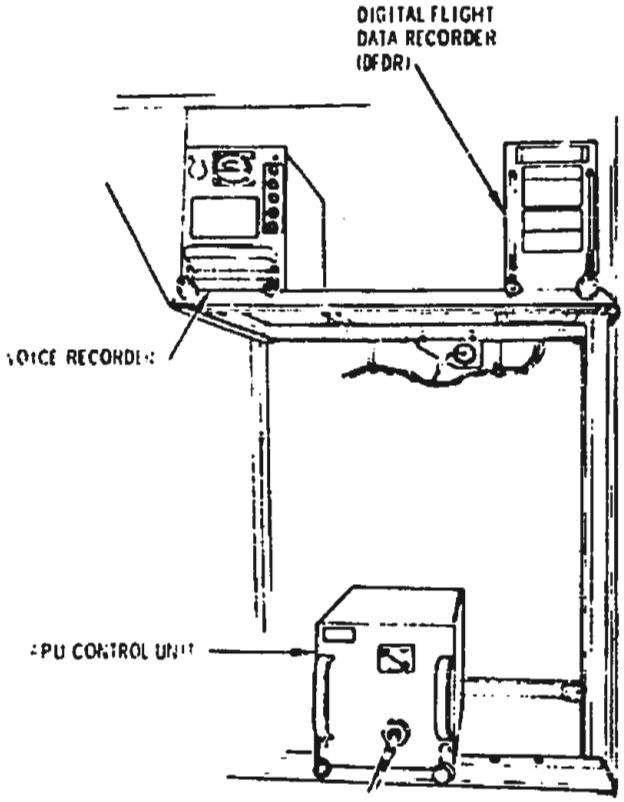
R (5) Engage thumbscrews on mounting brackets at front of recorder. Tighten thumbscrews to secure recorder in place.

R (6) Close AEEA access door.

R (7) Remove tag and close circuit breaker opened in Step 2A(1).

R (8) Perform CVR system operational test (Ref. 23-71-00).

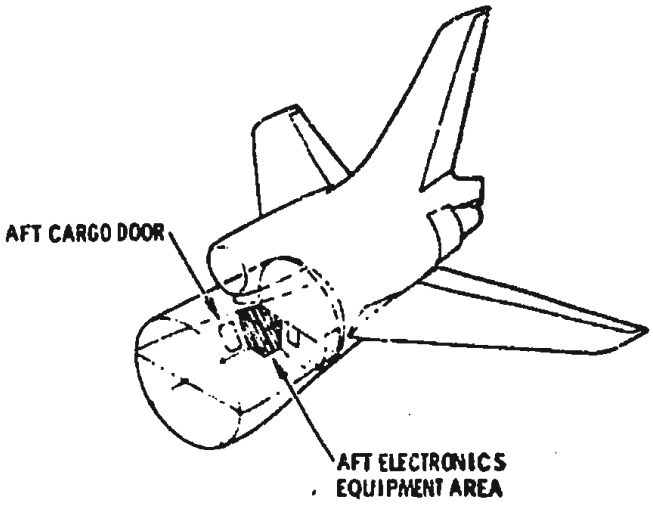


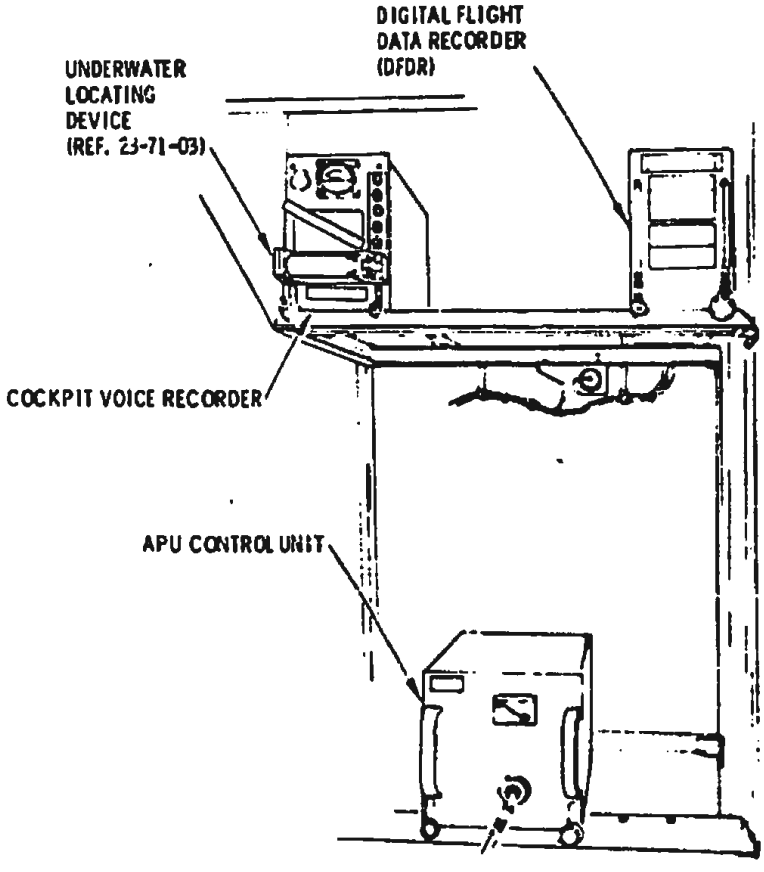


AFT ELECTRONICS EQUIPMENT AREA
VIEW LOOKING AFT

MI-4401-23-417

R Cockpit Voice Recorder - Removal and Installation
R Figure 401





AFT ELECTRONICS EQUIPMENT AREA
VIEW LOOKING AFT

M1-0000-23-1250

R Cockpit Voice Recorder - Removal and Installation
R Figure 401

CONTROL PANEL - REMOVAL AND INSTALLATION

R 1. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
32-48-00	Parking Brake System - Maintenance Practices
32-63-00	Air/Ground Sensing - Maintenance Practices

2. Removal/Installation

A. Removal

(1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker NO. 1 NAVIGATION - VOICE RECORD (D1).

(2) Support panel with one hand while releasing half-turn mounting fasteners (Ref. Fig. 401).

(3) Lower panel and disconnect connector on back of panel. Remove panel.

B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Connect electrical connector to back of panel and press into mounting while fastening half-turn mounting fasteners (Ref. Fig. 401).

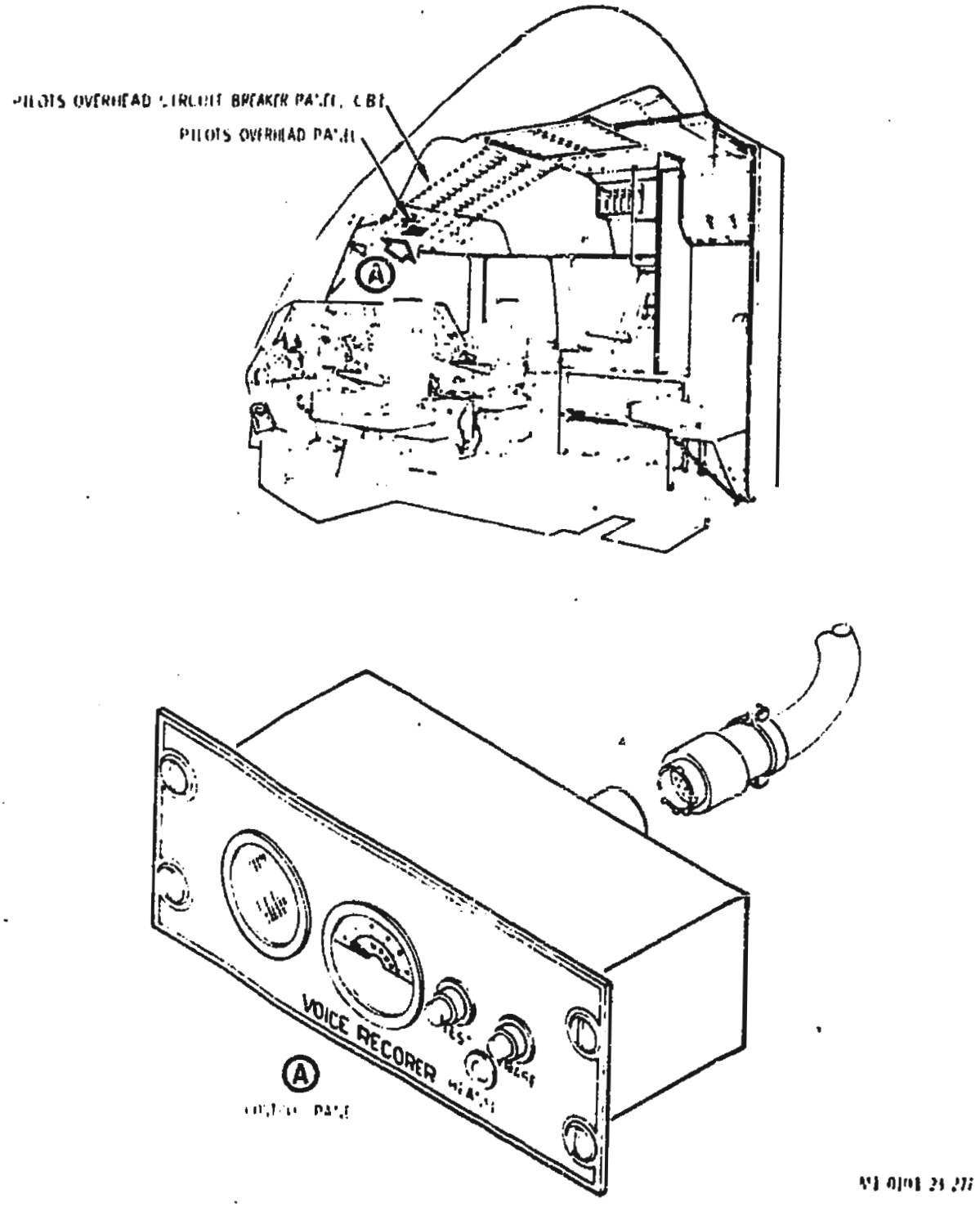
(3) Remove tag and close circuit breaker opened in Step 2A(1).

(4) Turn on electrical power (Ref. 24-00-00).

(5) Verify that parking brakes are set (Ref. 32-48-00), and air/ground sensing system is in ground condition (weight on wheels - Ref. 32-63-00).

R R (6) Plug headset into HEADSET - 600 OHMS jack on cockpit voice recorder (CVR) control panel.

Depress control panel ERASE switch for 2 seconds minimum.



Control Panel - Removal and Installation
Figure 401

Verify that 400-Hz bulk erase tone is heard in headset for 5 to 10 seconds.

R (7) Depress CVR control panel TEST switch and hold for 5
R seconds minimum. Verify the following:

R Interrupted 600-Hz test tone is heard in headset
R (test tone is automatically sequence-switched
R through CVR channels 1 through 4).

R Meter on control panel indicates in green band each time 600-Hz test tone is heard in headset.

(8) Speak in normal voice in flight station.

Verify that intelligible audio is heard in headset after 1/2-second delay.

(9) Turn off electrical power (Ref. 24-00-00). Disconnect
R headset from CVR control panel.

C UNDERWATER LOCATING DEVICE - REMOVAL/INSTALLATION

C 1. Remove Underwater Locating Device (ULD)

C A. Remove coverplate (MFR P/N 9300-581) by removing the four
C (4) flathead screws on the left side of the ULD bracket.
C (Ref. Fig. 401)

C B. Slide ULD out the left side of the bracket.

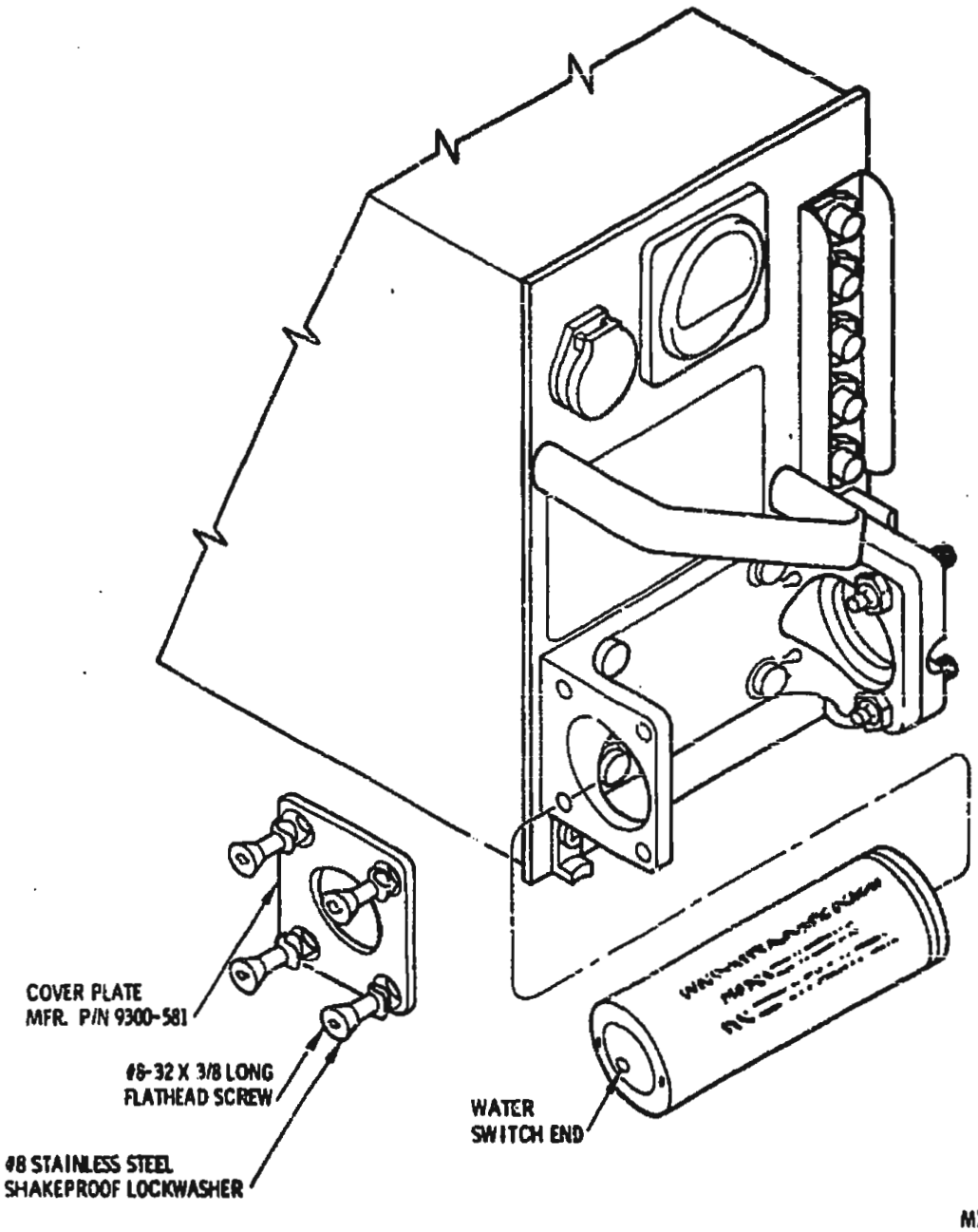
C 2. Install Underwater Locating Device (ULD)

C A. Slide ULD through the left side of the bracket and seat it
C firmly. Turn the ULD so that the battery expiration date is
C visible from the front of the voice recorder. (Ref. Fig.
C 401)

C B. Replace the coverplate.

CR NOTE: ULD test not required if just transferring ULD from
CR old recorder to replacement recorder.

C C. Perform a Functional Test of the ULD as described in
C (23-71-03, 501).



M1-0000-23-1321

CR
CR

Underwater Locator Beacon
Figure 401

R EFFECTIVITY: ALL
R
002B

R UNDERWATER LOCATING DEVICE - ADJUSTMENT AND TEST

CR 1. Test Underwater Locating Device (ULD)

CR A. Test Equipment Required.

CR (1) Dukane Model 42A12 Ultrasonic Test Receiver R & R
CR 90198.

CR B. Functional Test

CR (1) On the test receiver set input selector to INT position
CR and activate by turning the GAIN control full UP.

CR (2) Temporarily short the water switch on the ULD by
CR connecting a jumper wire from the center contact to the
CR case.

CR (3) Set the turning control to approximately 35 to 40 Khz
CR to receive an audible pulse at about one second
CR intervals. If the pulse deviates greatly from one per
CR second or the signal is relatively weak, replace the
CR ULD.

CR NOTE: The ultrasonic receiver may be tested by jigling
CR keys or coins in front of the microphone. This
CR should produce a clanging from the loudspeaker.